

FEBRUARY 1998

# Personal Computer World

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VNU Business Publications

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### Breaking the 300MHz barrier

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# Year 2000

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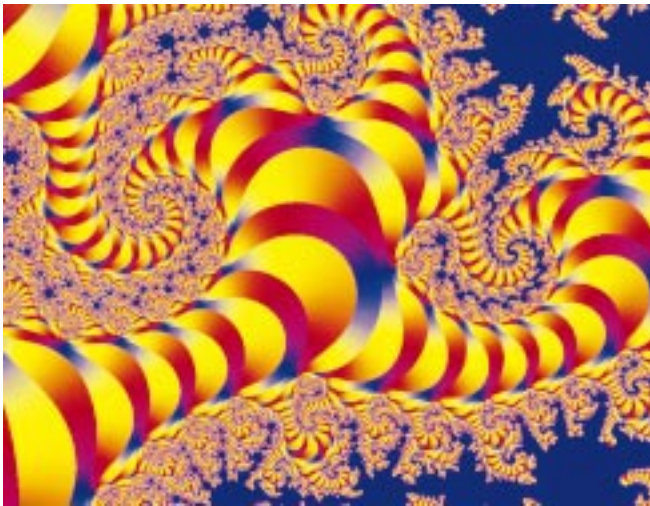
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# Personal Computer World



**LIGHT SPEED**  
Breaking the 300MHz barrier

**TOP TEN**

**Year 2000 Millennium Solutions**

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£195 Laser Printers  
£99 Scanners

**WIN HP PC & Printer**  
+ YEAR'S FREE PIPEX CONNECTION

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VNU BUSINESS PUBLICATIONS

# Editorial

New year, new technology. Whatever you say about the IT industry, it certainly moves at an unhalting pace.

Towards the end of every year is the annual Comdex



show in Las Vegas, where the coming year's proposed computer technology is shown off for all to see, touch, enthuse over, and then usually break. Just shy of a quarter of a million developers and marketing types attended last year, along with hassled journalists jostling for the best stories. Our Associate Editor, Clive Akass, braved the casinos and

tacky shows to bring you the hottest news in our Comdex special report in this month's *Newsprint*.

It's very easy to get caught up in all the hype, though. Exhibitors at the Winter 1996 Comdex show assured us that the universal serial bus (USB) and the faster FireWire media interface would be widespread on PCs and peripherals in 1997. But that year hardly saw a mass adoption of USB, and the FireWire front was even quieter.

In the past, much talk followed by a drought of products has typically heralded disaster, with the product or proposed standard disappearing into the obscurity of failed IT. Hopefully, the trend that we are now seeing means there is a lot less of this sort of thing going on.

Products move slowly from development to actual sale because these days, firms cannot afford to make big mistakes. Even though some still slip through the net, in general the time taken is the amount of time needed to get the product right. Take DVD, which, after two years of waiting for various Hollywood distribution agreements, really looks like it is going to take off in 1998.

I genuinely believe that USB and FireWire will finally make it this year, too. When you consider today's ridiculous and confusing situation of having different plugs for almost every device, the simplicity of USB and FireWire just have to take off. It is rather a shame that we could not settle on one truly universal bus.

Finally, it is that time of year again where we ask you to cast your votes in our 1998 PCW Awards. In return for your nominations, we will give one lucky winner £1,000 to spend on PC equipment of their choice. Turn to page 136 to enter, and remember — your votes count!

**Gordon Laing**  
Acting Editor

# Next Month



## Mid-range PCs

What's just the business for the home, equally at home with business, and costs below £1,500 ex VAT? A mid-range PC, that's what. Lynley Oram puts them on test.

## Notebook PCs

Portable power has never been so affordable. Adele Dyer and Paul Trueman carry on with the best notebooks for £2,000 (ex VAT).



## Presentation tools

Bin the pointy stick and the blackboard: these days, the best presentations are made with computers. We look at the software and devices designed to help you put your point across.

## Plus...

## Home entertainment

Plugging the PC into your TV may herald a new world of entertainment or annoy the family when *EastEnders* is on. We look at the bigger picture of convergence in IT and consumer electronics.

**March '98 issue**

■ On sale Thursday 29th January

\* Next month's contents subject to change.

# February Cover disc

**Technical Helpline 0891 715929**  
Calls cost 50p per minute

Welcome to the February 1998 *Personal Computer World* cover CD-ROM.

### James Bond Interactive Trailer

In the wake of the latest James Bond movie, *Tomorrow Never Dies*, In Chair Viewing presents a fully interactive presentation of the story, the characters and the hardware from the film. There is also an opportunity to see a quality full-screen version of the *Tomorrow Never Dies* film trailer, and if that doesn't keep you going for a while, play an active part in James's mission by getting a coded message to "Q" in a desktop game.

### Playing the competition

Help Bond get a message through to MI6 using Elliot Carver's satellite system.

Rotate the "CMGN" satellites by rolling over and clicking the rotation arrows. Click the transmission button to send the message from Elliot's HQ [Base 1]. If you have the satellites at the correct angles, the message will be relayed using all the satellites to MI6 [Base 2], where "Q" can decode the information for you.



**PhotolImpact (Windows 95 only)** The complete desktop imaging solution for the web and office, PhotolImpact's WebExtensions technology allows you to create fast, efficient web sites, with animations and dazzling effects. PhotolImpact with WebExtensions provides a set of tools to make imaging for the web and office easy, fast and convenient.

**Tomorrow Never Dies: Get your coded message to "Q"**



Create wonderful photo effects with this digital image-editing software

### How to use the CD-ROM

Quit existing applications (if you have 16Mb or more of memory you don't have to do this, but will still get better performance if not too many other applications are running). Put the disk into your CD drive:

**Win 95** If you've got Windows 95, the *PCW* interactive loader will appear on your screen. If your CD doesn't autoloading, go to Start/Run and type in <CD Drive>:\pcw.exe  
**Win 3.1** From Windows Program Manager choose File/Run, then type in <CD Drive>:\pcw.exe and press enter.

#### System Requirements

You need a PC with Windows 3.1 or later and a colour VGA display. For best results run it on a Pentium PC with at least 16Mb of memory.

#### CD-ROM Problems

The technical helpline is open weekdays from 10:30am to 12:30pm and 1.30pm to 4:30pm, on 0891 715929. Calls cost 50p per minute.

If you experience problems with the CD-ROM, such as a message like "Cannot read from drive D:", please return the disk and a covering note with your name and address and marked "PCW CD FEBRUARY 98" to:

TIB plc  
TIB House  
11 Edward Street  
Bradford  
BD4 7BH

A replacement disk will be sent to you by post.

**PhotoSuite 8.0** is digital image-editing software which lets you create even more dazzling photo effects with the new Photo Lens Kit, more decorations and more frames. It also provides support for digital cameras and scanners and a photo organiser. There's a Multimedia Library filled with hundreds of professional colour photos, sound effects, music files and animations.

**Sidekick 2.0** This FULL VERSION of Sidekick 2.0 for Windows is one of the best-selling personal organisers ever. Instant productivity and natural ease of use make it the personal software for the individual user. Record and manage all your personal and business information, and your important lists and projects from sales prospects to household inventory. It's all completely customisable so Sidekick works the way you want it to.

You can also try the demo of Sidekick 98, the latest version of the number-one organiser that helps you manage and mobilise all your information.

**Superbase 95** is the relational database with Visual Power. Providing you with the tools you need to get the job done, it is a modern development environment built around a small, fast, efficient and proven database engine and a robust set of tools.

## Featured Games

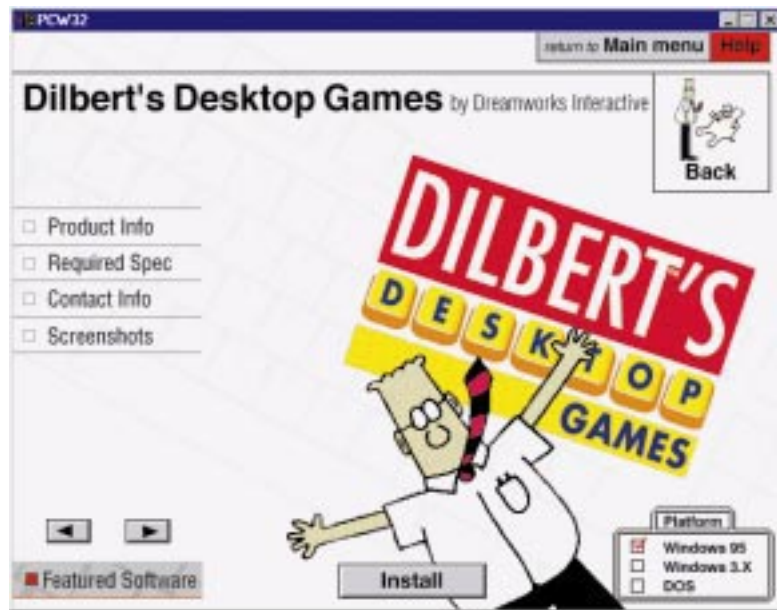
This month's featured games are:

**Dilbert's Desktop Games** Scott Adams' phenomenally popular characters come to

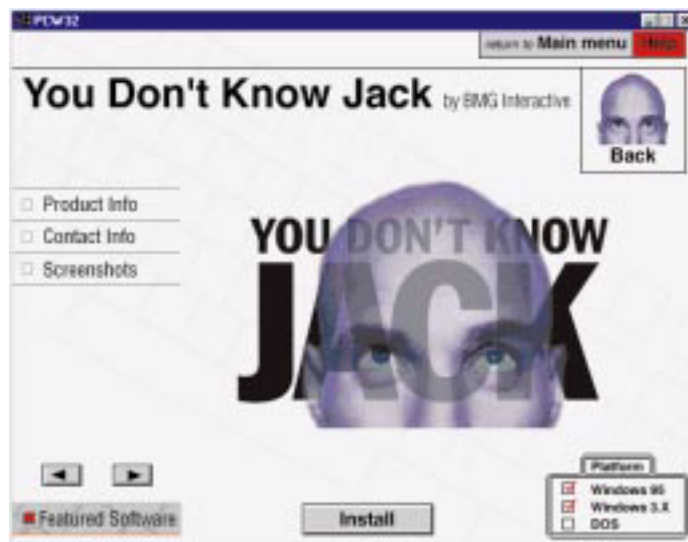
### IMPORTANT NOTICE

The publisher, VNU, has checked the *Personal Computer World* CD-ROM for known viruses at all stages of production, but cannot accept liability for damage caused to your data or your computer system which may occur while using either the disc or any software contained on it. If you do not agree with these conditions, you should not use the disc. It is good practice to run a virus checker on any new software before running it on your computer, and to make regular backup copies of all your important data.

Unless otherwise stated, all the software contained on the CD is for demonstration only. This means that it may be restricted in some way — for example, it may be time-limited or have certain functions disabled.

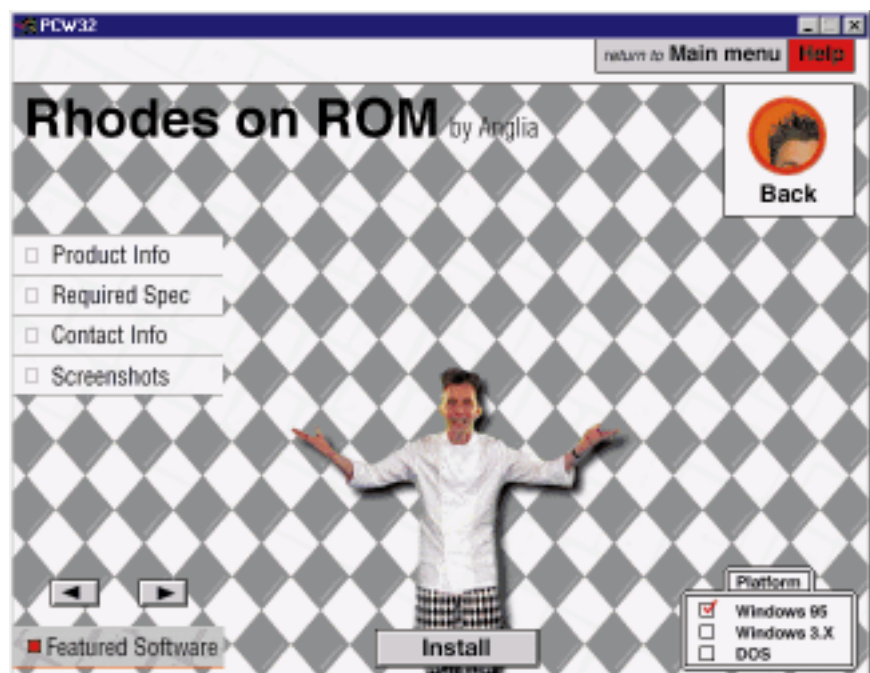


**Above** Play games with Scott Adams' Dilbert



**Left** This groovy spoof quiz game is lots of fun

**Below** If you can't stand the heat, get Gary Rhodes to lend a helping hand





Up-to-date weapons at your disposal in this new flight-sim

life in this hilarious and undeniably fun collection of Dilbert's Desktop Games, including BOSS EVADERS, PROJECT PASS-OFF, CEO SIMULATOR, THE JARGONATOR and more. Full of the irreverent humour of the Dilbert cartoons, this a must for put-upon office workers everywhere.

**Joint Strike Fighter (Windows 95 only)** is the first flight-sim to give simulator fans the opportunity to try out many of the US



## Full working version of Sidekick v2

Sidekick is the best-selling personal organiser software ever, with more than 10 million users around the world. Everyone needs to keep a note of their contacts addresses and telephone numbers and to keep their appointments in a diary. Sidekick obviously offers this, but it also has a lot more to offer besides.

Probably the most useful features are those that let you manage your contacts and information effectively. The cardfiles let you record any kind of data, from personal information like addresses, to the date and chateau of your vintage French wine cellar. A call log system lets you manage your phone calls and recall all the notes you took while on the phone. The View-in-View facility lets you look at your calendar when you are in your contact book and vice versa, and you can merge information into your word processor and spreadsheet.

You can set alarms to remind you to make important phone calls, create to-do lists and note goals. There are backup and restore facilities as well, so if you have a system failure you do not lose all your most precious data.

But perhaps the most compelling reason for using Sidekick is that it is so easy to use. You can be up and running as soon as you have loaded it, and as several *PCW* reviewers have found, once you have started to use it, you will not want to uninstall it.

**System Requirements** Windows 3.1, 3.11 or 95, 386 or faster, 2Mb RAM, 3Mb hard disk space.



For upgrade prices, please contact: Roderick Manhattan Group 0181 875 4441 [www.rmg.co.uk](http://www.rmg.co.uk)



military industry's latest weapons still under development. This demo features excellent graphics using the latest 3D technology to render the weapons and closely observed terrains.

## Featured Multimedia

**You Don't Know Jack** A spoof of American quiz shows, this trivia quiz is loud, brash and hilarious nonsense. It refreshes the parts other spoofs cannot reach and takes the artform to the nth degree. You are on an imaginary radio quiz show with quizmaster, musical introductions to questions and "Bronx cheer" buzzers used to answer questions.

**Rhodes on ROM** TV cook Gary Rhodes ventures into the world of new media in Rhodes on ROM. This is cooking guaranteed to set your mouth watering and to keep you busy in the kitchen.

### Important notice to readers

The cover CDs for the November issues of *Personal Computer World* and *What PC? and Software* contained a program called Lamb Screen Toy. VNU has been informed that this is commercial software and not available for free use. Please do not download this program onto your system, and if you have, please delete it. Copies of this software may be obtained from Village Centre at [www.villagecenter.co.jp/english/poe.html](http://www.villagecenter.co.jp/english/poe.html)

## Special Notes

The following files, which are referred to in the *Graphics and DTP Hands On* section of the magazine, are not included on the CD: ballofi.jpg, clockfac.jpg, daysky&c.jpg, man.jpg, montage.eps, nightsky.jpg, pic1.eps, pic2.eps, pic3.eps, pic4.eps, pic5.eps, pic6.eps, pic7.eps, pic8.eps, pic9.eps, screen2.jpg, woman.jpg.

These files can be downloaded from the web at the following URL address: [www2.vnu.co.uk/hc/pcw/graphdtp.htm](http://www2.vnu.co.uk/hc/pcw/graphdtp.htm)

### Wanted: Material for PCW cover CD-ROMs

We are always on the look-out for material for our cover-mounted CD-ROMs. If you think you have something that might be suitable, such as software, pictures, fonts or demos, please let us know: email Matt Honeyball at [matt\\_honeyball@vnu.co.uk](mailto:matt_honeyball@vnu.co.uk) or write to him at CD Development, New Media, VNU Business Publications, VNU House, 32-34 Broadwick Street, London W1A 2HG. *Please note that Matt cannot accept technical support calls.*

# February 1998



## PCW INTERACTIVE Complete Contents List

### FEATURED SOFTWARE :

#### APPLICATIONS

PhotoImpact, PhotoSuite 8.0,  
Sidekick 2 full version,  
Sidekick 98, Superbase 95

#### GAMES

Age Of Empires, Dilbert's Desktop  
Games, Joint Strike Fighter

#### MULTIMEDIA

You Don't Know Jack,  
Rhodes On ROM



## Personal Computer World

F O L D   H E R E

### Software Library

- Dance eJay
- Recall Database
- Visual BASIC
- A1 Collex
- K-Chess Elite
- Epoch Organiser
- WallPaper Paste
- Arts & Letters Express
- Paintshop Pro 3.12
- Paintshop Pro 4.14
- CyberContact
- NetFerret Utilities
- Internet Explorer 3.03
- Internet Explorer 4
- Acrobat 3
- Cygnus
- DirectX 5
- Icons Control
- Norton Anti Virus
- Winzip 6.3
- Dance music maker
- Business appliance database
- Runtime library
- Addictive puzzle game
- Improve your chess
- Personal Information Manager
- Desktop Wallpaper cycling utility
- Drawing Package
- Latest version
- Latest version
- Internet contact & address manager
- WWW, FTP, E-Mail, NEWS, IRC, phone search utilities
- Internet suite for Win 3.1
- Internet suite for Win 95
- PDF file reader
- Windows HEX editor
- Microsoft video driver
- Icon viewer and editor
- Latest windows archiver

# Borland Delphi Special PCW reader offers

If you want to create software that is fast to develop and speedy to run, Delphi is the best solution. We've got together with Borland to offer *PCW* readers exclusive opportunities to buy the latest versions of Delphi at savings up to 75 percent off! Delphi 2 Developer and the latest Delphi 3 Professional edition, complete with rights to deploy applications are available at very special discounted prices. See opposite page for full details.

Delphi's visual design environment lets you create sophisticated Windows applications faster than any other development tool. Because Delphi is built around an optimising native code compiler, Delphi applications are between ten to 20 times faster than interpreted code.

Delphi delivers three of the key features most sought-after by today's developers:

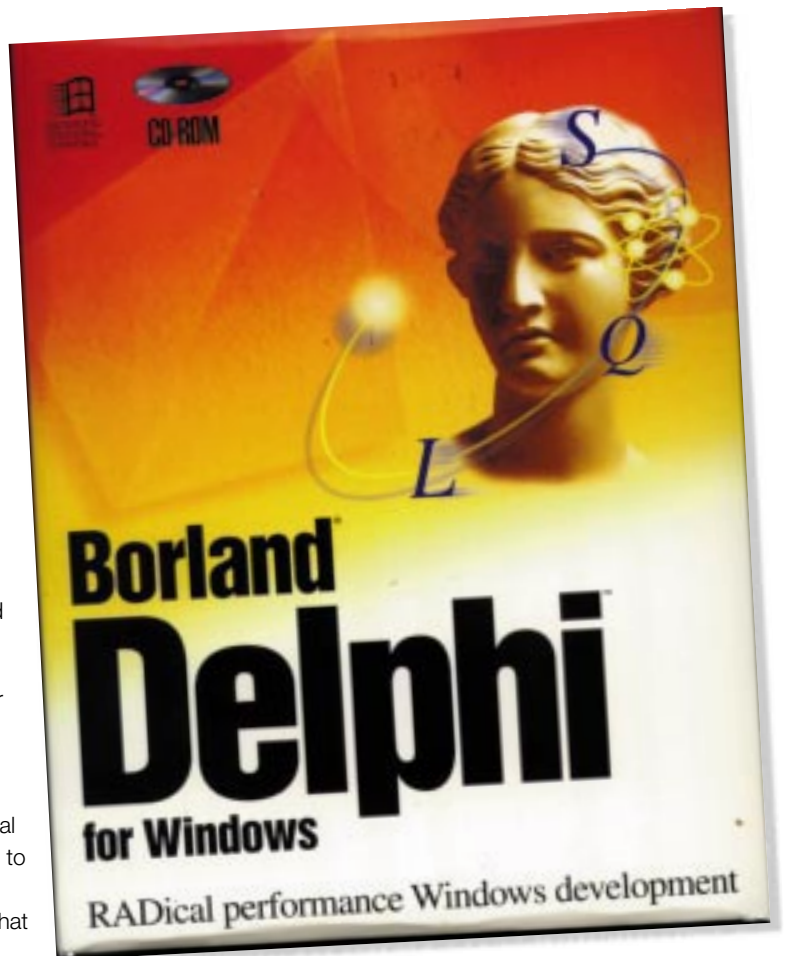
1. Rapid development: On the surface, Delphi looks a lot like Visual Basic. Add a form, pop on a control or two, double-click a button to add a few lines of code, click Run and away it goes.
2. Native code compilation: Delphi compiles to true executables that potentially run as fast as applications created in C or C++.
3. Object orientation: Delphi supports classes with constructors and destructors, inheritance, encapsulation and polymorphism — all the essential characteristics of an object-orientated language.

You can also program procedurally in Delphi. You get the best of both worlds: Delphi is easy to learn if you are familiar with Visual Basic or xBase, but all the benefits of objects are available, too.

Delphi integrates the Borland Database Engine, so you have instant support for dBase, Paradox, and ODBC local databases.

#### System requirements for Delphi 1 on Dec 97's *PCW* cover CD

- Delphi requires Windows 95, 3.1 or a 100 percent compatible operating system, an 80386 or newer processor (486 recommended) and 6Mb of system memory. A minimum installation requires approximately 30Mb of disk space.
- DCC.EXE, the DOS command-line compiler, requires at least 1Mb of extended memory.
- Delphi has been tested under Windows 95, Windows 3.1, Windows for Workgroups 3.11, Windows NT 3.5 and OS/2 Warp.



It includes the Local InterBase Server so you can create standalone client/server applications with a high-performance ANSI SQL-92 compatible database server.

Also included is Borland's award-winning ReportSmith report writing tool, which allows programmers to prepare innovative reports using live data in all popular database formats.

For more information, browse the Delphi web site at [www.borland.com](http://www.borland.com)

#### Limited licence offered through *PCW* on Dec 97's free Delphi CD

- This software can only be installed onto a PC once. It is not shareware.
- Applications developed using the software may not be deployed.
- The software is for personal use only by software developers and may not be used for development or teaching in a commercial or educational establishment.
- Programs and applications that have been constructed with the software may not be distributed. The software is provided only with the aim of allowing the owner to learn the use of this software. For distribution rights of owner-generated applications, the owner will have to purchase a copy of additional software or a package designed for this purpose.
- No resale of the CD is permitted. No free support is available with this CD. Full licence details on the CD.



# Special offers

**Learn to program with Delphi: £29.95 + VAT (normally £42.51+ VAT)**

Includes limited edition of Delphi 1.0 (full software, but no option to deploy applications) and includes a full online curriculum and tutorial as well as the acclaimed book, *Learn Delphi in 21 Days*.

**Delphi 2.0 Developer: £99.95 + VAT (was £399 + VAT)**

Lowest price ever! Includes full Delphi 2.0 Professional for Windows 95 and Windows NT, with full printed manuals and rights to deploy applications. Also includes Delphi 1.0 with rights to deploy applications.

**Delphi 3.0 Professional: £249 + VAT (normally £399 + VAT)**

The very latest in Delphi technology, along with the rights to distribute applications. Delphi code can be used anywhere that ActiveX is supported, including Microsoft Office and Internet Explorer. The Delphi 3.0 environment is much improved, too, with handy auto-coding features and an impressive set of wizards. Database connectivity now includes Access MDB data and FoxPro's style of memo and index files, in both cases without requiring ODBC. Overall, Delphi is the best Windows development tool.

## Order Hotline 0800 454065

Call our telephone hotline and quote reference **PCW3**, or complete the coupon and send it to:  
**PCW Offer, Borland Information Centre, PO Box 527, London EC2B 2ZA**

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# Newsprint

## VOX POP

New Year views on where computing is at. Collected by Sue Pederson

### Car's software will cost more than its hardware

■ Peter Cochrane, director of BT Labs, says huge investment in intranets in 1997 may make them more important than the web.



"Wireless technology is also starting to emerge. We're getting rid of all those cables.

"Chips will soon be in everything. This year, many cars have seen their electronic cost exceed their metal cost. So probably in the next couple of years, the software cost will outstrip the metal cost."

Miniaturisation will put PCs into unlikely places, such as a belt or even a brooch. "We will see a migration of technology into jewellery."

### Look before you leap into online sales

■ Ovum analyst Mark Stevenson (right) hopes the SET (Secure Electronic Transaction) standard will make people happier about using credit cards online, but says there is as yet little added-value buying on the net. Companies with the right products are making lots of money online.



"But the bookshop Amazon lost a lot of money last year."

He warns that selling online is not as cheap as people think it is.

"If you're not used to it and can't fulfil the orders, then maybe you shouldn't be doing it."

### Rise of the set-top box

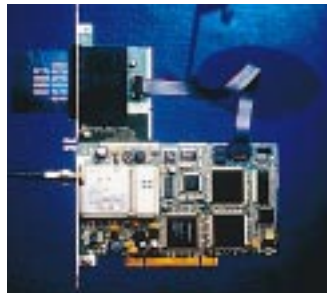
■ Nigel Saker, senior consultant, OTR, sees the PC fragmenting into smart appliances "There will be a lot of interaction through the TV rather than the PC. The TV is a friendly device.

"Set-top boxes will get into houses without people even knowing about them. People will get used to them and then the cable companies can build in more interactive features, probably by the end of next year."

## The PC goes to pieces

This month's *Newsprint*, with more than five pages of reports from Comdex, is a snapshot of desktop computing as we enter 1998.

This is a threshold year much like 1987, when PCs



Sub-\$300 Adaptec PC card, to ship next year, receives Eutelsat digital TV and data

### Outlook for 1998

awaited the power of cheap 486 chips to exploit fully the graphical user interface.

Only now, the bottleneck is bandwidth rather than processing power, and it will not be overcome easily.

The first major step will happen this year when digital radio and TV starts to take off, providing a path for massive data broadcasting (see picture, left).

The PC is getting the fast internal AGP bus (page 29) and new external serial ports (pages 41 and 47). Storage

costs are plummeting (page 27), enabling new activities such as digital photography (page 41).

One trend is for cheaper PCs (page 30), another is towards modularity (page 41), as well as fragmentation into appliances. Most fascinating is the evolution of the mobile, with a fashion for mini-notebooks (pages 26 and 46).

These developments are closely allied to an evolution of input methods ... handwriting (page 29) and speech recognition (page 48), and the feeling mouse (page 47).

Clive Akass

## Big Intel shifts under pressure

Bruce Stephens, PC analyst for IDC, said chip cloners AMD and Cyrix had helped catalyse the desktop market, with Intel shifting strategy in the face of increasing competition by looking at the sub-\$500 PC market. "You're going to see higher levels of integration, new

### VOX POP

high-speed buses...and a greater inclusion of DVD. USB is gaining momentum."

Windows CE dominates handheld devices and will start to take hold in other areas like

Windows terminals, set-top boxes and even cars. High-bandwidth technology like xDSL and cable modems has made slow progress. The cost of desktop LCD monitors has shown a modest fall to below \$2,000, but it is still way above prices of CRT monitors.

## Microsoft adopts HTML as lingua franca

HTML is to be made the lingua franca of Microsoft's Office suite as well as of the web, the company has announced.

One reason for the move is to provide file compatibility between different versions of Office — a bone of some contention among users. Another is to boost the use of intranets for collaborative working by easing the creation of HTML documents, said marketing director Denis Tevlin.

In practice, the move will mean phasing in "hi-fidelity translation" between Word and HTML and back over the next year. The delay is caused by the fact that HTML is not yet up to the task, Tevlin said.

## Aeiii! say IE 4.0 crash victims

A number of irate users have complained to PCW of system crashes after installing Microsoft's Internet Explorer 4.0 browser.

A new 4.0.1 upgrade addresses some issues. "There were problems with some Compaq Presario users, but we had a fix for that pretty quick," said product manager Martin Gregory. "If you look at the number of downloads — a million in the first 48 hours — there's a very high level of satisfaction."

**APOLOGIES** yet again for problems at our web site caused this month by rewiring at VNU. Our Comdex special pages are now up at [www.pcw.vnu.co.uk](http://www.pcw.vnu.co.uk)

# Wintel loses its grip

Microsoft and Intel, which have dominated the PC world since its beginnings, end the year bigger and richer than ever. Yet the ground was gently slipping from under them. The prime mover of change, not always obviously, was the internet, which has extended within organisations even faster than beyond the firewalls. The result is that computers all over the world are at last talking the same languages: TCP/IP, HTML and, to a lesser extent, Java. Open systems, long a dream

## Overview of 1997

of IT visionaries, have arrived by accident as a byproduct of the net.

Bill Gates may continue



his battle with Sun over Java, but he has already lost this wider war.

Intel may be able to stave off the chip cloners but it is itself buying into alien processors, including

Digital's implementation of Cambridge-based ARM's RISC core.

Computing has cut the umbilical: it no longer needs Wintel. Microsoft and Intel may well continue as strong as ever. But like mighty ex-king IBM, whose throne they usurped during the retreat of the mainframe, they will never hold the same sway again.

**Clive Akass**

**Inset: Faster processors need faster RAM. Fast Direct Rambus DRAM like this, from Kingston, will be in use in 1999.**

## Read-write keeps CD spinning

Bob Peyton, director of IDC's European Storage Research, says DVD has taken off slower than expected and drives will sell in thousands rather than hundreds of thousands.

"You'll see products in the shops next year but significant titles will be missing. The

## VOX POP

games on DVD are magnificent and will be what will drive it. I thought Men in Black was fantastic." DVD-RAM has shot itself in all three feet again. Until there is an installed base of DVD-ROM, it has to compete

with Jaz [Iomega's 1Gb drive]. But prices seem to be coming down. CD-R and CD-RW (read-write) prices are dropping rapidly too. If CD-RW can increase its speed to 16x, you've got a hell of a product for replacing CD-ROM. It will keep the CD alive for longer.

## Computer detects when you're telling the truth

It's not quite computer's intuition, but it's close. Text summarisation software, which works by counting the most frequently used words and then highlighting the sentences where the greatest number of these words occurs, has become increasingly clever at working out the gist of long articles and web pages.

US-based Communication Development has taken it one step further, with CoreTex. Market research companies are starting to use CoreTex to figure out what their interviewees are really saying.

By analysing a person's speech, they say, you can find out whether a person actually does like a product — or if they're telling a porky. Even spookier, it's claimed to be able to decipher the real motives hidden in politicians' speeches: expect a ban soon!

**Susan Pederson**



*'Damned machine called me a liar!'*

## VOX POP

### Java apps are going to arrive thick and fast

■ Andrew

Hammett (right), director of Bloor Research, said:

"I think the Net PC has come and gone. But only ten percent of large corporations say they're just not interested in network computing. The lack of an office suite has slowed down NC development, but Java applications are going to start arriving thick and fast next year."



### No real alternative to ISDN has emerged

■ Ian Keene, senior industry analyst, Dataquest, said 56K modems have done more harm than good so far, with the confusion over standards limiting sales. ISDN in the UK has lacked effective promotion but no alternative is emerging. "Generally, ISDN is on a good growth curve and I can see it being the leading connectivity option [for businesses] over the next five years."

Business and consumer internet access will diverge, and the hot option for businesses will be the outsourcing of remote access to create virtual private networks. "We will see service level guarantees and different classes of service for businesses; but consumers are going to have to wait for some time to get better service.

"No-one is investing long term in backbone equipment and there's no one perfect technology solution. At the same time, we're seeing internet traffic with exponential growth and no sign of levelling off. A lot of ISPs are in fire-fighting mode."

### Y2K bug situation is very, very worrying

■ Robin Guernier (below), director of Taskforce 2000, has said that only one in ten firms are ready for the millennium. "Any sizeable business

that hasn't taken the first step by the end of March is not going to get it done. It's very, very worrying. And remarkably, they're going to introduce the Euro at the same time. Year 2000 must take precedence."



## Microsoft watch

**Legal battles reach Nader**

■ Microsoft's legal troubles continue. The US Computer and Communications Industry Association (CCIA) has condemned its licensing agreements as "restrictive and anti-competitive" and is supporting the Justice Department's anti-trust action against the company. The DOJ alleges that Microsoft has forced PC suppliers to bundle the Internet Explorer browser with machines running Windows 95. The CCIA has taken similar action in the past against IBM and AT&T, among others.

■ Microsoft declined an invitation to the Appraising Microsoft conference organised by consumer advocate Ralph Nader, saying that it would be "ambushed by sharpshooters."

The forum featured representatives from Netscape and Sun. Microsoft also postponed its Java developers' summit in December, citing scheduling conflicts with the Internet World conference in New York.

Some observers speculated, however, that Microsoft simply wanted to avoid facing developers so soon after the first court hearing in the Sun dispute.

■ Like an unpopular kid handing out sweets in a desperate attempt to be liked, Microsoft commissioned its own public opinion poll. Unsurprisingly, it discovered that 70 percent of Americans believe the government should keep its nose out of software regulation and let the free market determine what features should be included. The survey also found that Microsoft is the single most admired company in one of the most admired industries in the US.

■ Islington council tenants criticised Microsoft for excluding them from its "cyberstreet" trial.

The trial gave thirty people free internet subscriptions — and in some cases, free computers — for six months. Council and housing association tenants, however, alleged that only middle class residents who already owned computers were chosen to take part.

**Susan Pederson**

# Shop-your-boss body's piracy purge riles judge

The anti-piracy body that launched the "shop your boss" scheme in Britain has been pilloried by a Belgian judge for a "dishonest" anti-piracy purge. In a stunning defeat for the Business Software Alliance, the judge told it to stop some of its campaigns.

The BSA has often been criticised for depending on tip-offs and scare tactics. Its members include Microsoft and Novell.

The Belgian ruling at a trade tribunal followed a BSA campaign similar to one launched in Britain in October under the name Crackdown 97.

Acodit, an association of Belgian corporate dealers, complained of an official-looking questionnaire sent to 5000 business. Its president, Jean-Claude Log, said Acodit was swamped



with calls from worried firms who had been asked for details of software use and licences. An accompanying letter threatened to prosecute companies caught using illegal software.

The Belgian judge said the campaign abused copyright law and was not in accordance with honest

business practices. The judge ordered all filled-in questionnaires destroyed.

The judge has also ordered BSA Belgium to stop offering to pay for tip-offs. Log welcomed this as a victory for good business practices and manners. "You treat a customer with respect. You

don't threaten him," he said. In the UK, the BSA says it is doing nothing illegal.

Graham Arthur, a solicitor with its advisers, Covington & Burling, said: "I don't see any basis at all for legal action to be brought against BSA ... arising out of the Crackdown 97 campaign."

**Dominique Deckmyn**

## First colour-display Windows CE handhelds ship in Britain

Three handhelds using the latest Windows CE 2.0 are now available in Britain. The new operating system supports colour displays, ethernet connectivity and email attachments for Word, Excel and PowerPoint files.

The Compaq C-Series PC Companion features an integrated modem, voice recording and a colour display. It will start shipping by the end of the second quarter, but prices had not been set at the time of going to press.

Hewlett-Packard's 620LX has a colour display and an optional VGA-out card that

allows you to display full-size PowerPoint presentations or Excel spreadsheets. The dedicated CompactFlash card storage slot frees up the PC Card slot for a modem.

The street price is around £699.

Casio plans to release its 80MHz 32-bit Cassiopeia (left) this month. It has a serial port for the Casio digital camera range and a flash memory port for future upgrades, and will retail for £499.

Microsoft plans to port Windows CE into devices other than handheld PCs.

Anne Mitchard, internet products marketing manager at Microsoft, says that the operating system will eventually appear in web telephones,



# 200Mb Sony drive enters fray for superfloppy crown

Sony has introduced a third contender into the battle for a successor to the traditional 1.44Mb floppy drive.

The HiFD, shown for the first time at Comdex, takes 200Mb disks but can also read and write 1.44Mb floppies. Sony says it will ship some time next year and will give no details on prices.

It will compete with the well-established Zip, whose 100Mb disks are now a common exchange medium; and the LS-120 (aka the a:drive and the SuperDrive) which takes both 1.44Mb and 120Mb disks but has yet to catch on to the same extent.

Sony claims a maximum transfer rate of 3.6Mb/sec for

the HiFD, compared to a maximum sustained 1.4Mb/sec for the new Zip Plus, and 290Kb/sec for the LS-120.

The marketing manager for Imation's version of the SuperDrive (it is manufactured by several companies) said the HiFD was only a prototype and Sony had yet to show that it could be manufactured. (Sony touted its MD data drive as a floppy replacement four years ago but it did not appear for more than two years — and then at an unrealistic price.)



He also doubted whether the drive could be made thin enough for notebooks — a growing market for both the SuperDrive and the Zip.

But the HiFD could prove competitive with another product from Zip maker, Iomega: see story below.

● Five-page Comdex Special starts on page 41.

**Clive Akass**

## Iomega Clicks into digicam market

Iomega, maker of the Zip drive, may have another winner with its latest wheeze.

It's a tiny portable drive called the Klik!, which uses 40Mb disks the size of a 2p coin and costing \$10.

Iomega floated the idea months ago as the Nohand, a microdrive for fitting into digital cameras and other devices. But the first product is exterior and comes with a docking station (above) for transferring data. Iomega says the \$200 drive will ship next year.

Ironically, one rival may be Sony's 200Mb superfloppy (see story above). Sony already sells a digicam fitted with a floppy, which works well (see page 41).

Flash-memory vendor Sandisk said the Klik could actually boost sales of its products. Marketing vp Leon Maimed said: "People will download from Flash to the Klik."

Iomega 0800 973194; [www.iomega.com](http://www.iomega.com)



## ...as an old rival puts up new competition

Removable-storage specialist Syquest, which was knocked sideways by the success of Iomega's Zip, hit back with its second major product announcement in as many months.

It has launched the 4.7Gb Quest drive, costing \$599 including one cartridge. Additional cartridges cost \$199. It boasts 2Mb caches and Ultra SCSI, allowing

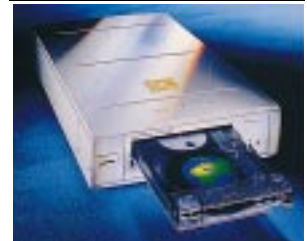


real-time video streaming for applications such as DVD mastering.

The launch at Comdex came just four weeks after the announcement of Syquest's SparQ drive, costing about £125, with 1Gb cartridges costing just £24 each. Both drives are due to ship early next year.

Syquest 0131 339 2022; [www.syquest.com](http://www.syquest.com)

### Storage shorts



■ Tandberg's newest addition to its high-end storage family is the 50Gb MLR3 tape drive, which can back up 28Gb in less than two hours. It comes in internal or external models and is compatible with earlier Tandberg SLR-MLR products. Prices start at £1,795 ex VAT.

Tandberg 01582 769071  
[www.tandberg.com](http://www.tandberg.com)



■ Trying to decide which way to jump on storage? Panasonic has complicated matters with its new portable PD drive, the awkwardly-named LF1500 EPB. The 650Mb rewritable optical disk and CD-ROM drive, which weighs less than a kilogram, is being touted as the perfect notebook storage. Panasonic promises that its upcoming DVD-RAM drives will both read and write to existing PD disks, and it tosses in Seagate's comprehensive Backup Exec software and a free PD disk — all for £299.

Panasonic 0500 404041  
[www.panasonic.co.uk](http://www.panasonic.co.uk)

### File on the Flip side

■ Another portable storage device comes from Amacom. The Flip Disk has a PCMCIA interface one end and a parallel port the other, for easy links to desktops and portables. Inside is a hard disk. Street prices are £350, £440 and £550 ex VAT respectively, for 1.4Gb, 2.1Gb and 3.2Gb capacities.

Amacom 0181 993 7373

# Is the writing on wall for the PC keyboard?

Handwriting recognition is beginning to look seriously useful, with Paragraph's CalliGrapher 5.0 for Windows CE walking away with two awards at Comdex.

It offers natural recognition for all styles of handwriting, whether print, cursive, or a mixture of both.

Paragraph claims that the product requires absolutely no training because it relies on fuzzy logic and neural net techniques to recognise your doctorly scrawl.

The software supports drawing, data input and spell-checking as well as standard text. Paragraph offers a free 15-day limited version on its web site, as well as an online demo.



One company is reported to be porting it to the Psion, and another to Windows 95.

Psion also recently announced that handwriting recognition software called Allegro would be built into its EPOC32 operating system for mobile devices.

The software, developed by Papyrus Associates, will then be shipped to EPOC32 licensees, such as Philips, to include in their own devices.

Psion hasn't decided yet whether handwriting recognition will be built into future Psion organisers, though.

CIC announced in

December that Compaq would be bundling QuickNotes with its new C-Series PC Companion (see page 26). QuickNotes lets you capture handwritten notes and drawings on Windows CE handheld PCs, storing them in chronological order for easy access. Its electronic ink compression then reduces the note size to save disk space.

CIC 001 (415) 802 7888, [www.cic.com](http://www.cic.com);

Paragraph 001 (800)

810 0055, [www.paragraph.com](http://www.paragraph.com);

Psion 0990 143050,

[www.psimon.com](http://www.psimon.com)

**Susan Pederson**

## Short stories

### Millennial electronics revolution predicted

■ A research firm is foregoing gloom and doom predictions for the millennium. It promises a "consumer electronics revolution" that will change our lives over the next three years.

Specialised devices such as smartcards and set-top boxes will begin to appear in greater numbers as prices fall, predicts Nigel Saker, senior consultant at Organisation and Technology Research (OTR). "Because these devices are not all things to all men, they can be made cheaply and robustly," he says. "That's definitely not a feature of the current PC."

He warns PC makers not to be distracted into making faster and faster models. "The danger is that they might miss out on the simpler devices."

He says businesses too will have to adapt. "We're not saying that the high street is going to disappear. But there will be alternative channels, such as buying straight from the manufacturer."

**Susan Pederson**



■ PC Card makers are getting more sensitive to power drain. This CE-supported wherret card draws only 5ma compared to 100ma on other comms cards. Meanwhile, BT has launched the Prologue X3, which combines GSM, ISDN and standard phone links. Prices range from £229 to £359, depending on functionality.

Portable Addons 01483 241333; BT [www.bt.com](http://www.bt.com)

### Fast Mac notebook

■ Creative types will be rubbing their hands in glee over the PowerBook G3, which incorporates the third-generation G3 processor optimised for the Mac OS. Its 50MHz system bus is 25 percent faster than previous PowerBooks, with a claim that it is the fastest mobile available. The price tag might cause a few wincing, though — £4,149 ex VAT.

Apple 0800 127753

p30 >

## Non-Intel board makers open up Socket 7 to new fast bus

A flurry of motherboards supporting both the accelerated graphics port (AGP) and Socket 7 chips was released late last year, causing vendors to bicker over which was first.

Intel pushed the AGP bus to speed graphics for video conferencing, games and 3D computer modelling on boards using the Pentium II's Slot 1 architecture. The new non-Intel boards extend the feature to the older Socket 7 used by Intel Pentiums, as well as Cyrix and AMD processors. Their specs were very similar, using VIA Technologies' VP3 chipset. TMC Technology's T15VG has 512Kb onboard cache and allows up to 768Mb of FPM/EDO/SDRAM memory. The board supports USB as well.

FIC's 1stMainboard PA-2012 (pictured) supports up to 1Mb Level II cache, SDRAM and USB, as well as the LS-120 drive.

California Graphics released Sunray II VIA



AGP with a similar spec. It is expected that AGP technology will soon begin appearing in mainstream PCs.

**Susan Pederson**

FIC [www.fic.com.tw](http://www.fic.com.tw); California Graphics boards available from Mentor Computer Systems

01582 483381, [www.calgraph.com](http://www.calgraph.com);

TMC 01438 842 300, [www.mycomp-tmc.com](http://www.mycomp-tmc.com)



Short stories



■ ClipTrakker is a handy new utility from Silicon Prairie Software that allows you to keep track of a number of clipboard items at a time. Sort, print, edit and paste — it retains items even across reboots. It costs US\$25, but you can try it out for free for 30 days at [www.cliptrakker.com](http://www.cliptrakker.com)

Free Space

■ FreeSpace, a new £39.95 Windows 95/NT utility from Atlantic Coast and Mijenix, claims to pack up to 150 percent more files on to your hard drive by selective compression. Atlantic Coast 01297 552222 [www.atlantic-coast.com](http://www.atlantic-coast.com)

Remote unzipper

■ Quarterdeck has added new intranet and internet features to Zip-It 4.0, including I-Zip. It lets you view the contents of zip files over the net and extract which items you want without downloading the entire archive. Zip-It costs £29.99. Quarterdeck 0645 123521 [www.quarterdeck.com](http://www.quarterdeck.com)



■ Overworked? Then check out Purple Software's 5 Pack of games for the Psion Series 5. You get Home Run, Checkers, Yacht, Theole and Enigma, for £39.95. Purple Software 0171 387 7777 [www.purplesoft.com](http://www.purplesoft.com)

Y2K threat to comms

■ Telecomms systems will be hit hard by the Y2K bug, says a report from Mitel. It found that more than a third of UK organisations are unaware of it and only seven percent are preparing for it. Telephone banking, shopping and direct insurance could grind to a halt as a result, the report said. Mitel 01291 430000; [www.mitel.com](http://www.mitel.com)

# Intel develops cheap PII chip as rivals aim for a \$500 PC

From Tim Bajarin in Silicon Valley

The annual strategy conference run by Phoenix, which writes the BIOS for about three in four PCs, was important even before Intel took a 10 percent stake two years ago.

This year's event focused on the sub-\$1,000 PC, and the living-room PC. Compaq and IBM's low-cost offerings have made most players think twice about competing with them. Packard Bell, which offered the first sub-\$1,000 PC for 1995 Christmas buyers, is

now targeting businesses.

The big news was that Intel's desktop-



systems vp,

Pat Gelsinger, confirmed the development of a Pentium II to power future sub-\$1,000 PCs. Intel CEO

The other major issue at the conference was the PC in the living room. S3 demonstrated its Faroudja chip that allows digital PC output to be used on an analog TV display.

@Home, Web TV and NCI all showed enabled TV models using picture-in-picture designs to marry TV content with specific web content.

Adaptec showed a board that can download 650Mb in 10 minutes from a satellite.

Cyrix and Cirrus Logic

showed reference design for what they called the PC media center, with 3D stereo surround sound, DVD, a 2.6Gb HD, a TV tuner, an enhanced viewing chip like S3's Fouradja, and a 56K modem.

Gateway and Compaq offer much the same set-up but with a 35in PC/TV monitor and a \$3,000 price tag. These reference designs could result in sub-\$1,000 products and allow PC makers into the TV market.

Andy Grove has long denied that Intel would focus on lower-cost processors.

But Computer Intelligence reckons four in ten PCs bought in US shops this Christmas will cost under \$1,000. Most use the Cyrix MediaGX or the AMD K6. Cyrix and AMD are having trouble cloning the PII and a low-end version could be a winner.

National Semiconductor president, Brian Hallas, suggested that we are close to a \$500 PC, with a trend for integrating comms, multimedia and general processing on to one chip.

National, which bought Cyrix with its integrated MediaGX earlier this year, has chips for sound, video and comms. Hallas believes these could power a system costing less than \$500, including a CD drive. Most vendors present had yet to produce a sub-\$1,000 model.

## Norton 3.0 targets Registry

Symantec says it's got all the bases covered with the latest version of its Norton Utilities for Windows 95 disaster recovery software. A new standalone Norton WinDoctor claims to "intelligently detect and fix problems" in the Registry, system files and applications. It deals with problems such as missing DLLs, lost shortcuts and invalid Registry entries.

It also groups problems according to their likely cause, so if you accidentally delete an application, it will identify all the problems caused by your mistake and fix them at once. CrashGuard 3.0 has been fully integrated into Utilities 3.0, running continuously in the background to help stop crashes before they happen.

CrashGuard also includes Norton Anti-Freeze to restore frozen applications. Rescue Disk has been improved, and Zip Rescue now allows users to save rescue information on an Iomega Zip disk.

Some new optimisation features have been added, including the Optimisation Wizard which speeds up booting times by tinkering with the Windows Registry and swap file. Speed Disk has also been radically improved, placing the most often used files at the front of the disk and less used ones at the back, speeding up the system and reducing fragmentation.

Susan Pederson

Symantec 01628 592222; [www.symantec.com](http://www.symantec.com)

# Scotch mist surrounds hyperlinks

Scottish courts missed the chance to set a precedent on the legality of hyperlinking when an acrimonious battle between two rival newspapers was effectively settled out of court.

A Court Session judge stated that hyperlinking would still be



allowed, but that links would have to be acknowledged with a logo. It would also not be allowed to link to individual news stories, but only to the main headline page.

The legal wrangle erupted in 1996 when *The Shetland Times*

complained that *The Shetland News*, an electronic news service, was placing hyperlinks from its web site to their news stories without permission.

*The Times* wanted to ban *The News* from doing so, but the case raised worries that a legal precedent would jeopardise online

freedom. David Flint, a solicitor for the IP and Technology Law Group at MacRoberts, Solicitors, called the settlement "unfortunate". He said: "There wasn't a clear decision made. It would have been interesting to see what would have happened

if the two parties had had more resources to fight it."

He doubts the settlement will put an end to such disputes. "As

*The Shetland Times*

long as the internet was being used by people who were technically minded and not business minded, they didn't really think these things mattered," he said.

"But now we're talking about people with substantial amounts of money invested in their web pages and their web advertising, and they're not going to take it lightly."

**Susan Pederson**

[www.shetland-times.co.uk](http://www.shetland-times.co.uk)

[www.shetland.news.co.uk](http://www.shetland.news.co.uk)



■ Visitors will be able to get more out of London thanks to a network of touch-screen kiosks from Cityspace. Information Plus (i+) has details in six languages about restaurants, museums, shopping and theatre. Users can book tickets and print out maps. [Cityspace 0171 235 2225](http://Cityspace 0171 235 2225)

Unless you've been locked away behind your virtual reality headset, you can hardly have failed to hear the phrase "centre of excellence" bandied around in recent weeks in connection with Cambridge.

It would seem that excitement has spread to the US, where Intel has followed Microsoft in investing in Cambridge. It has bought the StrongArm technology, based on a core from Acorn sibling ARM, from Digital. And it has bought a \$2 million equity in Cambridge Display Technology, which is developing thin flexible light-emitting polymer (LEP) screens for VR-headsets, mobile phones, VDUs, wall-screen TVs and even digital paper.

Intel said: "We make investments with strategic intent in companies where we think they have a technology that will help drive the marketplace." The investment is believed to be Intel's first in a UK start-up.

CDT will announce this month a joint development with a Japanese company for a

## Intel invests as 'digital paper' comes into view

**Caroline Swift continues her reports from Silicon Fen**



video display which it will scale onto computer displays.

Mark Gostick, business development manager, said LEP screens can be 40 percent cheaper than comparable technologies.

First products will ship next year: Philips, CDT's first licensee, is working on a backlight for mobile phones, and Uniax will have a dot-matrix display for mobile phones.

CDT will show a prototype mono 2.25in screen in April, which it says will be the first of its size to display video in a way that can be viewed easily. It is expected to be used in portable devices that will act as both viewphones and organisers.

The latest investment leaves Cambridge University with a

stake of up to 25 percent in CDT; a slightly larger share will be owned by a group of entrepreneurs headed by former Trade Minister, Lord Young of Graffham, on completion of its investment over the next four years. By then, the venture company known as Light Emitting Polymer Investments will have invested some £6.6 million in the tiny Cambridge company.

Lord Young will then become chairman of CDT, and the company will be valued at £22 million. Today, it has just 25 staff and, as a victim of the city's success, it has been unable to find suitable premises for expansion. So it will stay in its confined premises down a narrow farm track, investing in a

clean room and equipment — and more staff. Right now, it has vacancies for chemists, physicists and process engineers.

■ Cambridge-based Sibelius Software has shown the US film industry how to hit the right notes. Its Sibelius 7 software, effectively a word processor for music, was used to orchestrate and print the music for *GI Jane*, starring a shorn Demi Moore.

Sibelius turns music, played at a keyboard, into notation for editing, playback and printing. The SMPTE-compatible software can simulate an orchestra in exact synchronisation with video and was used to orchestrate Paul McCartney's new piece, *Standing Stone*.

Sibelius has now opened a Los Angeles office, selling to Hollywood composers.

[www.sibelius-software.com](http://www.sibelius-software.com)

## Microsoft watch

**Legal battles reach Nader**

■ Microsoft's legal troubles continue. The US Computer and Communications Industry Association (CCIA) has condemned its licensing agreements as "restrictive and anti-competitive" and is supporting the Justice Department's anti-trust action against the company. The DoJ alleges that Microsoft has forced PC suppliers to bundle the Internet Explorer browser with machines running Windows 95. The CCIA has taken similar action in the past against IBM and AT&T, among others.

■ Microsoft declined an invitation to the Appraising Microsoft conference organised by consumer advocate Ralph Nader, saying that it would be "ambushed by sharpshooters."

The forum featured representatives from Netscape and Sun. Microsoft also postponed its Java developers' summit in December, citing scheduling conflicts with the Internet World conference in New York.

Some observers speculated, however, that Microsoft simply wanted to avoid facing developers so soon after the first court hearing in the Sun dispute.

■ Like an unpopular kid handing out sweets in a desperate attempt to be liked, Microsoft commissioned its own public opinion poll. Unsurprisingly, it discovered that 70 percent of Americans believe the government should keep its nose out of software regulation and let the free market determine what features should be included. The survey also found that Microsoft is the single most admired company in one of the most admired industries in the US.

■ Islington council tenants criticised Microsoft for excluding them from its "cyberstreet" trial.

The trial gave thirty people free internet subscriptions — and in some cases, free computers — for six months. Council and housing association tenants, however, alleged that only middle class residents who already owned computers were chosen to take part.

**Susan Pederson**

# Shop-your-boss body's piracy purge riles judge

The anti-piracy body that launched the "shop your boss" scheme in Britain has been pilloried by a Belgian judge for a "dishonest" anti-piracy purge. In a stunning defeat for the Business Software Alliance, the judge told it to stop some of its campaigns.

The BSA has often been criticised for depending on tip-offs and scare tactics. Its members include Microsoft and Novell.

The Belgian ruling at a trade tribunal followed a BSA campaign similar to one launched in Britain in October under the name Crackdown 97.

Acodit, an association of Belgian corporate dealers, complained of an official-looking questionnaire sent to 5000 business. Its president, Jean-Claude Log, said Acodit was swamped



with calls from worried firms who had been asked for details of software use and licences. An accompanying letter threatened to prosecute companies caught using illegal software.

The Belgian judge said the campaign abused copyright law and was not in accordance with honest

business practices. The judge ordered all filled-in questionnaires destroyed.

The judge has also ordered BSA Belgium to stop offering to pay for tip-offs. Log welcomed this as a victory for good business practices and manners. "You treat a customer with respect. You

don't threaten him," he said. In the UK, the BSA says it is doing nothing illegal.

Graham Arthur, a solicitor with its advisers, Covington & Burling, said: "I don't see any basis at all for legal action to be brought against BSA ... arising out of the Crackdown 97 campaign."

**Dominique Deckmyn**

## First colour-display Windows CE handhelds ship in Britain

Three handhelds using the latest Windows CE 2.0 are now available in Britain. The new operating system supports colour displays, ethernet connectivity and email attachments for Word, Excel and PowerPoint files.

The Compaq C-Series PC Companion features an integrated modem, voice recording and a colour display. It will start

shipping by the end of the second quarter, but prices had not been set at the time of going to press.

Hewlett-Packard's 620LX has a colour display and an optional VGA-out card that allows you to display full-size PowerPoint presentations or Excel spreadsheets. The

dedicated CompactFlash card storage slot frees up the PC Card slot for a modem. The street price is around £699.

Casio plans to release its 80MHz 32-bit Cassiopeia (*left*) this month. It has a serial port for the Casio digital camera range and a flash memory port for future upgrades, and will retail for £499.

Microsoft plans to port Windows CE into devices other than handheld PCs.

Anne Mitchard, internet products marketing manager at Microsoft, says that the operating system will eventually appear in web telephones, wallet and car PCs, set-top boxes and DVD browsers.

**Susan Pederson**

Casio 0181 450 9131, [www.casio.co.uk](http://www.casio.co.uk);

Compaq 0845 270 4000, [www.compaq.co.uk](http://www.compaq.co.uk);

HP 0990 474 747, [www.hp.com/handheld](http://www.hp.com/handheld)



## Internet shorts

**The right type of leaves online**

Hornby Toys is the latest big-name brand to take a leap into the online world. There are dedicated sites for both Hornby Railways and Scalextric, which feature news, products, club details and potted histories. Still to come are online shopping facilities and — this is the exciting bit — a racing game based around Scalextric.

[www.hornby.com](http://www.hornby.com); [www.scalextric.com](http://www.scalextric.com)



# SYNs of the hackers spawn the routers of evil

Hackers have found a new way to crash servers and routers. Land Attack exploits a bug in the TCP/IP stacks of computers running Windows 95, NT, Mac OS, HP/UX and Solaris, as well as some routers. However, SCO Open Server, Digital Unix, Novell Intranetware and the “freeware” Unix version Linux, are not vulnerable to the bug.

A hacker launching Land Attack sends a SYN packet to open a connection and “spoofs” the host server into believing that it was self-generated, thus causing it to go into a loop.

“The method is about as efficient as yanking out the power cord,” said internet security consultant, Kristof Van Damme.

Most worrying is the fact that the method was detailed in an internet mailing list received by system administrators and hackers alike, so it is now commonly known to hackers all over the world.

“If I were an ISP, I would install a patch as soon as I could get one,” warned Van Damme. “Right now, anyone can crash your server without leaving a trace.”

**Dominique Deckmyn**  
VNU Newswire

## Sun rises for Java to shine

Sun Microsystems has won the first round in its battle to make Java an international standard. It has gained approval to submit its technology to the International Standards Organisation (ISO).

Only the US and China voted against the move. And of the 24 countries which have a vote, two abstained and 20, including the UK, voted in favour of Sun’s bid to be a “Publicly Available Submitter”. This enables it to put Java through the two stages of approval for adoption as an ISO standard. The PAS system in effect provides a fast track through the standards process and Sun opponents have argued that it leaves the vendor with too much control over the future direction of the technology.

Sun’s euphoria over this victory was dulled by a row over Java benchmarks, ending in the company admitting to having “committed an unintentional error” when it published results for its Just In Time (JIT) compiler last October. Benchmark results suggested that Sun’s JIT compiler makes Java apps run 50 percent faster on Sun’s Solaris operating system than on WinNT.

Pendragon Software, creators of the widely used CaffeineMark benchmark, claimed that Sun’s new product was designed to detect parts of the benchmark, thus producing misleading results. Sun responded with a flat-out denial, stating that its new product had simply “blown the doors off” the benchmark and hinting that Pendragon’s criticism was inspired by pressure from Microsoft.

However, independent experts have since verified Pendragon’s findings, confirming that the JIT compiler contains a portion of the CaffeineMark benchmark code. This enables the compiler to detect and skip this code, thereby completing the program faster. This is a well known but dubious method of producing better benchmark results.

Sun has now retracted the press release, confessing that “the effect of the benchmark-specific optimisation was described as if it were an indication of overall application performance”.

[www.sun.com](http://www.sun.com); [www.iso.ch](http://www.iso.ch);  
[www.webfayre.com](http://www.webfayre.com)

HOME  
BREW  
DIRECT

### Home is where the booze is

■ Now the festive season is over, much of the country will be resolving to stay on the wagon for a while. The trouble is that the long, dark winter evenings tend to drag when you’re at home and all you have to look forward to is another EastEnders spat between Phil and Cathy.

A new company called Homebrew Direct may have the answer. It offers brewing kits for beer, wine and liqueurs, together with a range of books and videos on the art of homebrew. All ordering is done online or over the phone. If you are so inclined, the joys of brewing your beer will keep you occupied for a few weeks and give your liver a chance to recover from that Christmas over-indulgence. And who knows? With a bit of luck, the end result might even be drinkable.

[www.homebrewdirect.com](http://www.homebrewdirect.com)



**Java Computing**

Internet shorts

**Open University promises interactive web lectures**

■ The Open University (OU) is planning to conduct interactive lectures over the net, using speech and audio compression technology from Voxware. According to the OU, quality audio over dial-up connections is essential to keep students interested. Chat rooms and webcasts are planned in the continuing attempt to use the latest technologies for distance learning. This latest announcement follows the decision to use Marimba's Castanet push technology to send notes to students.

[www.open.ac.uk](http://www.open.ac.uk)

**Time to boot for soccer news**

■ UK Football Pages, as its name suggests, aims to list all sites dedicated to UK teams. Developer Lee Brookes says he expects such niche directories to become increasingly common as search engines become more congested.

The football sites are not restricted to Britain. Fans of UK teams have set up sites as far away as Australia.

[www.ukfootballpages.com](http://www.ukfootballpages.com)

# Virgin on the verge

Virgin hopes to boost consumer confidence in net shopping by moving many of its retail businesses online early in 1998. David Clarke, MD of Virgin Net, announced that Virgin would provide a Secure Shopping Guarantee to be built around a secure electronic transaction (SET) standard. The encryption-key service is likely to be the first retail application of SET in the UK.



Virgin territory: the Megastore will go online in January

The Virgin Megastore catalogue will be one of the first services to go live, and Richard Branson has promised that his travel and retail businesses would soon follow. He said: "The internet will either radically change or...enhance our business. But we'll have to provide added value." Also, Clarke revealed the company was considering producing its own set-top box which could cost no more than £200. Branson denied the suggestion that he plans to challenge Microsoft, but admitted: "Virgin is the only British name, on a global scale, that can give Bill Gates a run for his money. But there's still plenty of room for everybody."

Susan Pederson

[www.virgin.co.uk](http://www.virgin.co.uk)

## UK Top Ten Web Sites



Why not start the New Year with this hand-picked selection of the best new sites around, courtesy of Yell [www.yell.co.uk](http://www.yell.co.uk)? Those infamous Saatchis are topping the list but check out the Shell UK site (pictured above) for some seriously cool animated caveman action.

- |    |                              |  |
|----|------------------------------|--|
| 1  | Saatchi & Saatchi            | <a href="http://www.saatchi-saatchi.com">www.saatchi-saatchi.com</a>                         |
| 2  | Shell UK                     | <a href="http://www.shell.co.uk">www.shell.co.uk</a>   |
| 3  | Microsoft Network News       | <a href="http://www.uk.msn.com/default.asp">www.uk.msn.com/default.asp</a>                   |
| 4  | Rise                         | <a href="http://www.rise.co.uk">www.rise.co.uk</a>   |
| 5  | SpiceWorld                   | <a href="http://c3.vmg.co.uk/spicegirls/spiceworld">c3.vmg.co.uk/spicegirls/spiceworld</a>   |
| 6  | Michael Websters Home        | <a href="http://www.swanorth.demon.co.uk">www.swanorth.demon.co.uk</a>                       |
| 7  | Official Edward De Bono Site | <a href="http://www.edwdebono.co.uk/debono/home.htm">www.edwdebono.co.uk/debono/home.htm</a> |
| 8  | Brewworld                    | <a href="http://www.brewworld.co.uk">www.brewworld.co.uk</a>                                 |
| 9  | Webmedia 8080                | <a href="http://webmedia.com/8080/eighttfr.html">webmedia.com/8080/eighttfr.html</a>         |
| 10 | FontWorks                    | <a href="http://www.fontworks1.type.co.uk">www.fontworks1.type.co.uk</a>                     |

## Netscape loses share

Netscape's share of the browser market continues to fall but is nevertheless holding up well against Microsoft's free Internet Explorer onslaught. According to market analysts, Dataquest, during the third quarter of this year Netscape's share of the browser market fell to just under 58 percent, while Microsoft's rose to around 40.

This turnaround continues the trend from the end of last year when Microsoft had 20 percent and Netscape dominated with 73 percent. However, Netscape has challenged these figures, suggesting it still holds 67 percent of the web browser market. This number, like Dataquest's, is based on data from search engine usage.

Both figures represent actual usage rather than sales figures or the installed base of web browsers. The Dataquest results are based on use of the Alta Vista search engine, while Netscape monitors Excite, Infoseek, Look Smart and Yahoo.

[www.microsoft.com](http://www.microsoft.com)  
[www.netscape.com](http://www.netscape.com)  
[www.dataquest.com](http://www.dataquest.com)

# MSN pulls plug on access

MSN is pulling out of service provision in Europe to concentrate on providing content, general manager Mike Delman has announced. MSN access is currently provided in France, Germany and the UK, having been stopped in Belgium this year.

MSN customers will be transferred to other net access providers: in France, to France Telecom; and in Germany, to

Deutsche Telekom. In the UK, the MSN branded service is provided by Pipex, but it is not yet certain whether customers will be turned over to them.

MSN began in 1995 as a proprietary network service, competing with AOL and CompuServe. Following disappointing results, however, the company began converting the network to net standards.

MSN became both an internet provider and a web site, with some parts of the site only accessible to subscribers.

[www.uk.msn.com](http://www.uk.msn.com)



# Pay Barclaycard over the net

Barclaycard customers can now pay their credit-card bill over the internet. Its Netlink service also allows cardholders to check their account balance and their available credit limit. They can also view their previous statement and see subsequent transactions since the last statement was issued.

Transactions, such as settling a bill or applying for a card, are protected by

128-bit encryption. Barclaycard claims to be the first UK company to use this high level of security for financial services.

Another recent Barclaycard innovation is BarclayCoin, a form of electronic money. Customers can download "money" from their credit card to an electronic wallet which can then be used for online shopping.

[www.barclaycard.co.uk](http://www.barclaycard.co.uk)



# Go on, have a whine online

The Parliamentary and Health Service Ombudsman, Michael Buckley, is now on the internet.

If you are wondering what he does, you are not alone. As Mr. Buckley said: "...a recent survey revealed that many people in this country have not heard of the Parliamentary or Health Service Ombudsman, or if they have, they are uncertain about what types of complaint he can investigate. I hope our web site

explains this clearly and will make my office accessible to many more people."

The Parliamentary Ombudsman investigates complaints from those who believe they have suffered because of poor administration by government bodies or have been unjustly refused access to government information. The web site features a guide to the services and an online complaints form for completion.

[www.ombudsman.org.uk](http://www.ombudsman.org.uk)

## Internet shorts

### BBC starts net newscasting

The BBC has launched a free continuous news service on the internet.

The site publishes UK, world, science and technology, business and sports news stories as they break, together with background research and analysis. It also includes an hourly five-minute news bulletin with audio and video clips and carries a live transmission of the Nine O'Clock News every night.

Tony Hall, chief executive of BBC News, said: "BBC News Online is all about our commitment to provide a public service news choice for the next generation. We will offer a comprehensive, unbiased, instant news service accessible to all."

Over 40 journalists and web experts are responsible for producing stories specifically for BBC News Online, as well as writing stories fed in from the BBC's 2,000 global news staff. Unlike other free news sites on the web, BBC News Online carries no advertising.

[www.news.bbc.co.uk](http://www.news.bbc.co.uk)

### Demon deal for small firms

Demon Internet has launched a new service for small businesses (defined as those with 25 PCs and under) who wish to get on the web.

Its new Business Dial-Up service is integrated with Microsoft's Back Office Small Business Server suite and provides net access, email and web hosting (with 10Mb of permanently connected space) from a single modem or ISDN line.

Resellers are being offered good deals to sell BDU, which costs customers an initial £395 (ex VAT), including domain-name registration, plus £60 a month after two months.

Demon 0181 371 1234; [www.demon.net/](http://www.demon.net/)

### Where's the web site?

The pace of technological change is obviously proving a little too much for some people. PCW has recently had its cockles warmed by the tale of an elderly couple from Portsmouth.

Excited by the radio advertisement to visit a new building, the couple set off for Caversham in Berkshire. After a fruitless search for the location, they finally turned to a local for help...

and discovered the truth about the Thames Valley Web Site.

[www.thamesvalley.co.uk](http://www.thamesvalley.co.uk)



# The future on show

There was nothing too tasty at this year's Comdex Fall, but some of the exhibits did give an exciting glimpse into the future. Tim Bajarin reports.

**C**omdex was not quite the boring show many have suggested: LCD screens are poised to take over the desktop, high-speed MMX processors are not about to go away, and the PC is about to hit the road.

Gas-plasma screens are back in favour. Gavilan Computers used one on a laptop back in 1984 at a time when mono LCD screens were just coming out and colour LCD had not been perfected. The Gavilan screen emitted a yellow phosphorus glow and you could fry an egg on it. It drew so much power that less than 30 minutes of battery life was the norm. It was also hard to make. Then Toshiba's T1000 popularised



**Top** This Viewsonic 18in LCD monitor will be available next year — at a price. Excellent larger screens were demonstrated at Comdex  
**Above** CRT replacement? A Fujitsu 42in gas-plasma display

the LCD screen and gas plasma technology fell by the wayside. But gas plasma is starting to look like it can soon be cheap enough to replace CRTs, although it is still pricey and too thirsty for portables.

LCD makers also see a goldmine in replacing desktop CRTs. But they admit it will be some time before 14in to 17in TFT models are cheap enough to compete. But they are looking closely at custom chips from Arithmos, which speed up the refresh rates on relatively cheap dual-scan (DSTN) LCDs.

By late 1998 these chips will refresh dual-scan screens in 100 milliseconds or less, enough for full-motion video. Current dual-scan screens refresh at between 150ms and 300ms. Dual-scan screens are half the cost of faster TFT screens and could

challenge the CRT by 1999.

Meanwhile, PCs are not going away. Most office tasks today require only TIPS (tens of instructions per second) instead of MIPS (millions), but this is about to change. TIPS are fine for text or even simple graphics, but as we move towards more multimedia data types, the PC will finally be called on to really compute.

For audio, animation, video and 3D graphics, the PC is going to need high-speed processing in the CPU and companion chips. Add new interfaces such as voice recognition, spatial pattern matching and biometrics security features, and TIPS computing is history.

New users tempted by next-generation multimedia interfaces won't settle for a stripped-down NC that can only handle simple text and graphics off the web. Of course, you will see the NC in smart phones or areas where dedicated functions or tasks make sense. But the MM PC is going to be the computer of choice.

The last technology I saw that could have a dramatic impact on the role of computing in the future was the Auto PC. Intel was showing a mocked-up version of this idea in which an NC-like device, with an LCD screen, was built into the dashboard of a family van. Intel officials suggested it could be used for navigational purposes, as well as traffic reports and news feeds. This takes the concept of mobile computing in another direction and could be an important new platform for PC technology.

In a private session with Microsoft recently, I was shown its Apollo project. This is its version of an Auto PC. While I cannot tell you more about this until after 7th January, when it will be announced at the Consumer Electronics Show in Las Vegas, I can say that its use of Windows CE in a car will cause the entire auto industry to become Microsoft customers in the future.

While none three of these technologies is earth-shattering, if you take each of them and apply them to our industry, you begin to see some very important trends. Eventually, flat-panel displays will make CRT technology completely obsolete. It will take at least ten years, but flat-panel technology will some day be on your living room wall and serve as your PC/TV. This year's Comdex showed us the roots of this future world of video display.

You can also see how MMX technology and high-speed computations will be critical to any PC access device, whether it is in business or the home. And, over time, the PC platform will be extended to all automobiles, making them an important new market for PC technology.

So, while Comdex did not seem like it had anything really new this year, upon further reflection, there really were some important new technologies shown that will soon impact on every part of the PC world. ■

## The view from Las Vegas



It was another wait-and-see year at Comdex, the annual showcase for the IT industry. Everyone is waiting for more bandwidth, for this standard or that standard to be finalised, for yet another operating system upgrade. But big changes are imminent and they were all there in embryo.

The bandwidth problem is not limited to net links. Something has to deliver multimedia data streams and that means mega-servers (up to eight processors in parallel, with bigger on the way) joined by big pipes (flavours of the year are fibre channel and gigabit ethernet). But the desktop PC is also about to undergo major transformations which are reflected on these pages.

● *More details and pictures are in our in Comdex Web special report at [www.pcw.vnu.co.uk](http://www.pcw.vnu.co.uk). Companies marked in blue here are hyperlinked on those pages.*

## Fast buses take PC to a modular millennium

■ Technology for the PC's two new serial ports is at last coming together, and it will bring more than fast data links.

The Universal Serial Bus, which offers a 12Mbit/sec data link and a 5v power line, was fitted on 36 million PCs last year but is little used. It will take off in 1998 when Windows 98 provides the first robust drivers, the USB Implementers Forum said.

The faster 1394 (aka Firewire) will happen in a big way in 1999. A milestone has just been passed with the agreement of what is called the Open Host Controller Interface (OHCI version 1.0), which provides software control. NEC, Symbios and Texas Instruments (TI) showed OHCI controller chips. USB and 1394 both offer hot swapping, plug-and-play,



First Device Bay designs

and simplified wiring. The 1394 is faster: currently up to 400Mbit/sec, and 800Mbit/sec in 1998.

The two form the backbone of a new architecture called Device Bay, intended to ease the use and expansion of PCs.

The first Device Bay products were on show (actually mock-ups, for the most part). Each uses either USB or 1394 and slots into a bay fitted with both. You can add more bays by plugging them into external USB and 1394 ports.

● *See our web site at [www.pcw.vnu.co.uk](http://www.pcw.vnu.co.uk) for details and links.*



TI's new 1394 interface chip

## Comdex notebook (plus a Psion and a Sony digicam)

■ Comdex is hard work. You could get lost for a lifetime in the exhibition halls, and briefings and displays sprout in the hotels along the Vegas strip. The hotels, with casinos on the ground floor, are designed to get lost in: the longer the punters stay around the slots and gaming tables, the more money they give to the owners. Outside, walking can be quicker than cab. It's not the best of places to attend a rush of meetings, nor through which to lug a notebook PC, so I kept a Digital Ultra 2000 (reviewed, p75) at my

hotel for heavy-duty work. This was excellent, with its 14.1in TFT screen, 3Gb disk and swappable floppy and CD drives.

For those with a budget that runs to a £4,500-plus machine, I can report that it withstood the rigours of a transatlantic round trip. I took a Psion 5.0 around the show and found I could quite comfortably type mini-articles on it, although I had to resort to paper for fast notes.

I had forgotten to load PsiWin onto the Digital for transferring files from the Psion, so I tried to link the machines via their infrared ports. Each registered the other but refused to transfer data — so much for plug-and-play.

My other toy was a Sony Mavica MVD-FD5 digital camera. I'd wanted one with a zoom lens and had arranged to take an Epson PhotoPC 600, but this failed to turn up in time. The Sony's great advantage is that it has a floppy drive and packs 24 VGA JPG images on a 1.44Mb disk, so there is no problem with transferring files to a PC. I simply



Focusing is tricky with the Sony Mavica as you have only a fuzzy LCD screen to go by. This can be galling when you find Bill Gates standing next to you, presenting what could have been a good news shot. Here, he is frowning at a Mitsubishi AMI-II network computer running the Java OS on a Cyrix MediaGX processor. In the background you can see two portable AMITY wireless NCs also running the Java OS. Not a bit of Microsoft software in sight.

got Windows Explorer to list the JPG files on the floppy and dragged them into Paintshop Pro for sorting and editing. With 32Mb of RAM on the Ultra, there was no problem having them all open at once. It offers VGA resolution, and focusing is capricious, though there is a macro setting for extreme close-ups. But it's a good visual notebook, producing instant pictures at no cost and it's adequate for web use. You can see some of the results, flaws and all, here and on my Comdex Web special report. Remember that the images are reduced in size. I noted with envy a US journalist who was carrying the same Sony with a 10x zoom.

I loaded a beta of Front Page 98 on the Ultra to sketch out my Web special: my first attempt at direct hypermedia reporting. I kept things simple and the environment worked well, but the beta turned out to be flakier than I'd expected and kept losing pages. My fault for relying on unfinished software.



## Comdex shorts



### 'Big four PC vendors will corner market'

More than seven out of ten PCs sold worldwide in five years' time will come from just four companies, Compaq CEO Eckhard Pfeiffer said in his Comdex keynote speech.

He predicted that Compaq will be one of the top three. He also believed people prefer to buy through dealers offering service and support. "Dell and Gateway offer little in support," he claimed.

### SCSI stays ahead as ATM loses ground

SCSI will not be superseded by 1394 (see p41) for fast data links, according to the head of market-leading I/O specialist, Adaptec. "They will complement each other," Grant Saviers said.

He announced that Adaptec will ship an 80Mb/sec Ultra2 SCSI card, the AHA-2940U2W, in January '98 and said he believed SCSI would remain speedier than 1394. The new card doubles the current top burst rate and quadruples the maximum cable length to 12 metres.

Saviers also said that Asynchronous Transfer Mode (ATM) has lost the battle of the backbones to Fibre Channel and Gigabit Ethernet.

Adaptec was one of the first companies to target ATM cards at the mainstream market. "We backed it but it turns out we were wrong," Saviers told a press briefing.

### Voodoo board

Adrenalin Rush, a low-cost PCI implementation of the fast Voodoo Rush 3D/2D graphics chipset, will ship to Britain early in 1998, according to maker Jazz Multimedia.

Jazz 00 1 408 627 8900;  
www.jazzmm.com

# Rise (and fall?) of the mini-notebook



This machine, called the WordPad, from a small Californian company called H45, is about half as big again as the Psion 5.0 palmtop and much the same weight. It is little more than a basic word processor with a tiny LCD screen and 128Kb of memory.

It functions as a standard remote keyboard when you are at your desk. But you can take it away and keep on typing. When you get back to your desk, you just dump the data back to your PC. The batteries last not just three hours, but three months.

I have long had a hunch that the mobile, driven by a keyboard, pen, and/or voice, will become the universal computing interface; and the WordPad (just \$200 complete with an IR port for your PC) shows how simply it can be done.

Manufacturers are at last trying for portability, and from two directions: from the handheld up, and from the notebook down.



NEC is one of the first to move a palmtop slightly up in size to get a better keyboard. Its CE 2.0-based MobilePro700 H/PC (shown left, next to a Psion 5.0) sports an internal modem, a PC Card slot and a monochrome screen.

The "notebook down" approach is to offer the facilities of a Win95/NT notebook in as light a package as possible. The traditional approach is exemplified by Mitsubishi's beautiful Pedion, an anorexic full A4 size weighing in at just 1.9lbs, only 0.3lb more than the NEC.

But most fashionable at Comdex were mini-notebooks not much bigger than palmtops but running Win95 on colour screens. I have been ear-bashing vendors for years to do something like this, but their designs have caused me to rethink my own ideas.

The implementations are flawed because manufacturers in this market are not interested in making cheap machines which might usurp much of the lucrative corporate market in feature-rich notebooks. Thus, the new minis are light, but not that light — Mitsubishi's Amity CN (below) weighs 2.4lbs and the Hitachi

VisionBook Traveler is 2.7lbs.

Prices range from \$2,000; too much for something that, for most people, will be a second



machine. The machine that started the mini trend, Toshiba's Libretto (shown top, next to a Psion) is now available with a 120MHz Pentium processor.

These machines stand or fall, as road workhorses, on their keyboards. The Hitachi's was best to my taste but even that was not significantly better than the keyboard on the Psion 5.0; a good comparison because it has the best ergonomics of a pocketable.

The lesson, to me, is that if you are going to go bigger than a pocket machine, weight and ruggedness are more important than size. If I needed Win95 or NT on the road I'd go for a small notebook rather than a mini.



But my needs, and I suspect those of most travellers, are simpler: the kind of basic spreadsheet, organiser, email, and word-processing

facilities you get with a good handheld, plus ruggedness and the ability to swap data easily with a PC. No-one has yet come up with a definitive design. Personally, until handwriting recognition matures, I'd go for a cross between the WordPad for its elegant use of infra-red, the Psion for its guts, and the Apple eMate for its keyboard and ruggedness.

● See our web site at [www.pcw.vnu.co.uk](http://www.pcw.vnu.co.uk) for more details and links.

# Touching story of the mouse that feels



**Rosenberg:**  
computing  
with feeling

Every so often, an invention comes along that obviously will not work and will never catch on. And yet it does work, and it changes lives. One such was the bicycle. Another was the aeroplane. The Feelit mouse, from Immersion, may not be able to match their impact, but it shares that quality of improbability.

When dealing with the virtual world, the mouse gives you the kind of tactile feedback you get from the real world. It's an extension

of techniques used in force-feedback joysticks which feel like the real thing.

Immersion's president, Louis Rosenberg, first experimented with the ideas while researching human/machine interaction at Silicon Valley's prestigious Stanford University. The Feelit mouse, which sits on a motorised pad, is not simply for games. "It opens up an entirely new channel for you to communicate your needs," said Rosenberg. It can even give a sense of



texture, smooth or rough. "Windows is a good place to add feeling. When you drag an icon, it has weight. When you stretch a window, you can feel it stretch." Most usefully, you can "feel" the edge of a window, which can be tricky for novices but

impossible for the poorly sighted, who will clearly benefit most.

It will ship late next year for \$139, complete with Windows software. The prototype at Comdex was rather cumbersome yet worked surprisingly well.

[www.immerse.com](http://www.immerse.com); 408 467 1900

## How an IR port can cost as much as an IR-enabled TV

Infra-red (I-R) ports on PCs are priced way out of proportion to costs, industry figures admitted at Comdex.

I-R ports are now fitted to most handhelds and notebooks yet they feature on few PCs. The result is that many users have no I-R port to at which to point.

I-R dongles which plug into PC serial ports cost upwards of £70 in England and \$50 to \$100 in the US. Yet they are built around a transceiver chip costing less than \$2 — even when bought singly.

PC I-R dongles were even more expensive until recently, costing much the same as a complete television equipped with a virtually identical I-R port plus an I-R remote control.

And I-R is easy to fit onto a PC. An IRDA driver for Win95 has been available for

### Standards get set for infra-red speed-up

The infra-red industry is gearing up for speeds as high as 30Mbits per second. This compares with 4Mbits per second today. Speeds will reach "at least" 10Mbits per second by the end of 1998, said IRDA president, Mike Watson. Specifications are already being drafted and will be finalised by mid-1998. Two moves announced at Comdex extend the IRDA standard to cover control functions.

A draft IRBus spec, backed by Intel and Microsoft, allows two-way control of home appliances and peripherals. It would allow a digital camera, say, to talk directly to a printer. The second move, the IR Mobile Communications standard, defines how PC applications can swap information, such as messages and appointments, with phones.

Details are at [www.irda.org](http://www.irda.org) and [www.irbus.org](http://www.irbus.org).

more than a year, and most motherboards are IR enabled, complete with a pinout for the transceiver. But IR dongles tend to link to



An IBM 31T 1100A infra-red transceiver chip

the serial port, pushing up costs. But Mike Watson, president of the Infra-Red Data Association, agreed that prices are nevertheless high.

And, he said, there have been problems getting PC makers to fit IR ports.

"They said there were not enough devices available to justify them. But that is no longer true, and I think we will see more and more of them fitted next year."



### Finger that intruder

Two new security

products won awards at Comdex. One was this neat fingerprint recognition system which protects your PC from intruders even when you have just walked away from your machine for a few minutes.

You just press your finger on the pad (shown, above) and, if you are authorised, you get your PC back. The package, called U.are.U, costs \$179 from Digital Persona.

The second product, called FaceIt, uses face recognition to protect even individual files. It will also store pictures of people who are denied access and will invite anyone who approaches your desk to leave a message. US prices are \$149 for a single seat or \$4,500 for a site licence. UK availability on neither product was available at the time of going to press.

Digital Persona 00 1 650 261 6070;

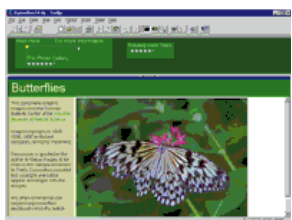
[www.digital.persona.com](http://www.digital.persona.com)

FaceIt developer Visionics

00 1 201 332 9213; [www.faceit.com](http://www.faceit.com)



■ If you must know, she is holding a flexible PC motherboard. More to the point, she is wearing a PC in pouches round her waist. It's from the Flexible PC company at [www.FlexiPC.com](http://www.FlexiPC.com).



**'Word processor of the future' wins award**

■ Microsoft Word step aside... the word processor of the future is called Trellix, according to US reviewers, and is designed to write and collate HTML pages.

Version 1.0, which costs \$99, won an award at Comdex. I did not get a chance to look at it but it will be available here shortly — and so will a PCW review. You can buy it or download a trial copy from [www.trellix.com](http://www.trellix.com).  
Trellix (US) 00 1 781 788 9400.

# Listening Windows ushers in voice-driven handhelds

Natural language speech control is to be incorporated into Windows, including cut-down Windows CE, opening the way for tiny, voice-controlled handhelds.

The move seemed on the cards after Microsoft put \$45m into Belgium-based speech specialist Lernout and Hauspie (L&H) last summer. And L&H president, Gaston Bastiaens, spoke of it as a matter of course when he launched L&H's first continuous-speech mass-market software at

Comdex. But he was cagey about dates, saying that only Bill Gates knew those.

The new products, Voice Express and Voice Express Plus, will be on sale for "less than \$100" early next year.

The cheaper Voice Express works only with WordPad, the word processor bundled with Win95; the Plus version works with Word.

Two rival continuous speech products, Dragon's Naturally Speaking and IBM's VoiceType, have been out since September but neither offers natural language speech control.

Voice Express Plus (in company demonstrations, at least) allows you to talk Word through complex formatting and editing tasks more or less as if you were speaking to a human.

This, thanks to the close alliance with Microsoft, goes further than speech recognition. Voice Express insulates you from the minutiae of tasks. You can tell it to make text into two columns, set up a table or add a column of figures, without knowing how it is done within Word. L&H claims, too, that you do not have to train it to your voice (though it gets better with use). Voice Express will ship early in 1998. You can already buy the voice control functions in Kurzweil's Voice Commands (£49.99 inc VAT).

● L&H showed a pager which delivers voice and alphanumeric messages over a standard paging system.

L&H [www.lhs.com](http://www.lhs.com)

## Space saver

The box pictured is actually a keyboard from a Taiwan-owned firm called Jamicon, opened up to show

the inside. This holds an entire PC, including a hard drive and expansion slot, yet is only slightly deeper than an ordinary keyboard. All you do to get a working PC is plug in a monitor. Perhaps it has been done before; but if it hasn't, why not?

Jamicon 00 1 818 333 9168 (ext 2565). Kaimei (parent) [www.asianet.com/taiwan/kaimei](http://www.asianet.com/taiwan/kaimei)



### Top 10 Windows software

			Last month
1	Encarta Deluxe 98	Microsoft	-
2	Bookshelf 1996 (Win95)	Microsoft	-
3	Money 98 Financial Suite	Microsoft	-
4	Win95 U/G with Internet	Microsoft	5
5	Flight Simulator 98	Microsoft	-
6	Nuts and Bolts (3.1 & '95)	Xatlantic	1
7	Smart Draw	Kiss	-
8	Home Essentials 97 C/V	Microsoft	-
9	World Atlas 98 v3	Microsoft	-
10	Student Office 97	Microsoft	-

### Top 10 DOS software

1	DOS 2 Win95 UG with Internet	Microsoft	4
2	Turbo Pascal v7.0	Borland	-
3	MS-DOS v6.22 U/G	Microsoft	5
4	System Commander v3.0	POW	1
5	Corel WP 6.2 U/G	Corel	3
6	Turbo C++ v3.0	Borland	-
7	FSFX UpGrade for MS Flight	Microsoft	2
8	Novell Personal Network	Novell	-
9	Mail PC Remote	Microsoft	-
10	Procom for DOS	Datastorm	-

### Top 10 CD-ROMs

		Last month
1	Catz 2	Mindscape -
2	Oasis Interactive	Euroscape -
3	Dogz 2	Mindscape -
4	Encarta 98 Deluxe	Microsoft 6
5	Encarta 98 World Atlas	Microsoft -
6	Encarta 98 Standard	Microsoft -
7	Star Wars Trilogy	One Stop -
8	StarTrek Encyclopedia	Zablac -
9	AA Camping & Caravanning Guide	BTL Publishing -
10	Spanish: Language Labs	Europress -

### Top 10 peripherals

1	Umax Astra 610 P	Umax -
2	HP ScanJet 5P	Hewlett-Packard -
3	Righteous 3DFX Accelerator	Orchid -
4	Mystique 220 4Mb PCI	Matrox -
5	USR Sportster Flash Ex	USR 3
6	Sidewinder Force Feedback	Microsoft -
7	Evergreen 486/586 proc U/G	MID 6
8	Awe 64 Value ISA	Creative 10
9	Sidewinder Precision Pro	Microsoft -
10	Awe 64 Gold	Creative 8

**S**antorini, 12th November, 1997. This is one of those Greek islands that, bunny-like, you hop across to when you get bored with Athens. And, as getting bored with Athens isn't something that tends to take long, many people make the hop. Having done so myself, I'm currently on the veranda of my villa, a bottle of local wine by my side (half of it already in me), my laptop on my lap, watching the sun go down. Which, in the off-season, is about all there is to do around here.

The only major drawback with this place is cloud activity. I'm perched here on the lip of a volcanic crater, effectively the top of a mountain, so clouds blow in all the time. Sometimes they just disperse. On other occasions, however, they get wedged in between rocks, crevices and other impediments, and have to be dislodged manually. This morning, for example, I found one had blown into my living room overnight through the open shutters. I had to take a broom to it, chop it into manageable portions, and force them all, one by one, into the kitchen extractor fan.

That aside, I'm essentially just eating, drinking and occasionally logging on — not through a local ISP, though. The biggest hereabouts, Greece's equivalent to Demon, is called Hellas Online. Before I flew out, I emailed the PR department, explaining that I was a columnist on this magazine ("the UK's most prestigious computing title") and would it be possible to sign on with them for the duration of my visit to Greece? You'd have thought the underlying sub-text ("Give me a free account") would have been readily understandable, especially to a nation whose literary luminaries, Herodotus and Thucydides, practically invented the sub-text. Nevertheless, a spokeswoman replied by return saying that not only would I have to pay up to use the service, but I'd be obliged to commit myself to a minimum three-month contract, too. I, of course, emailed them back with a torrent of pro-Lord Elgin sentiments.

This does neatly illustrate one of the major drawbacks of the so-called worldwide web: for people with conventional dial-up connections, it's about as worldwide as my local train service and equally as inefficient. A Demon or a Direct Connection account may be fine in the UK, but try using either abroad and it's like trying to spend Drachma in Camden Market.

You'd have thought that, by now, the various worldwide ISPs would have got their acts together to offer reciprocal agreements as, in effect, do their respective national telephone and postal services. But no. As far as I am aware, there's only one company in the UK which does this sort of thing, and then only to a limited number of other international internet providers.

Thus frustrated, I looked elsewhere. What about Microsoft Network? I asked Text 100, Microsoft's PR company. No chance, mate, they replied. Okay for Western Europe but no point of presence worth talking

about anywhere in the Balkans. Next, I considered CompuServe, but quickly decided against that: from past experience, I know its internet access, especially fundamentals such as Telnet and FTP, can often be something of a joke; likewise AOL, albeit a funnier one.

So, reluctantly I realised that if I wanted to connect at all I'd have to do so via a station-to-station overseas call; Greece to London. This would mean going through the Athens international telephone exchange, which is universally acknowledged as one of the main reasons God created the internet in the first place. It's all pulse dial, non-digital, and crossed lines.

It therefore came as something of shock to me to discover that, although it's virtually impossible to hold an audible conversation on a Greek overseas line, data transfer is, by complete contrast, miraculously efficient. Since I arrived, I've been getting a perfect connection every time and achieving top-whack speeds over the modem. Okay, I'm paying international rates for the pleasure, but at least I'm getting my email and I am able to check my portfolio values.

On the downside, I am still very uncomfortable about lugging this damn laptop around with me. I should have got over this by now, but I haven't. At 3.5lbs, it's not that the thing is particularly cumbersome. It's just that it feels fragile and thievable. The fact that it's heavily insured, all



Michael Hewitt

## Sounding Off

Having tired of Athens, Michael Hewitt is spending some time in Santorini. Never totally away from it all, he tries in vain for some international connectivity.

risks, doesn't do much for me. Apparently, if anything goes wrong, or it gets lost, a couple of hours later I get the hi-tech equivalent of the Milk Tray man scaling my wall to deliver a replacement. Maybe it would be worthwhile dropping it down the cliff just to see that... Maybe not.

Anyhow, it feels quite perverse yacking on about computers on an evening like this, with the sun sinking in the horizon, goats bleating on the hillside and the scent of jasmine wafting in with the light breeze. So I shall shut up now and go and open another bottle of wine. *Kalli nichta!*

■ [Mike.hewitt@mjh1.demon.co.uk](mailto:Mike.hewitt@mjh1.demon.co.uk)

I am holding over my promised look at hard-disk backup for two reasons. I have been waiting for several months for Hewlett-Packard UK to supply technical literature to back its claim that its CD-R backup system is better than others. Meanwhile, HP has loaned me the low-cost Colorado tape drive which claims to solve the problem with most tape backups: that a crashed Windows PC can no longer access backup data stored under Windows.

The CD-ROM which HP sent was one of its own gold backup CD-Rs containing pre-release software which did not work reliably. Then HP asked for the return of the drive before it had sent a final release pressed CD-ROM! Thanks to talks with Philips and HP in the US, I now have the full story on CD-R backup and will report next month. In the meantime, do not buy one of the new CD-ReWritable drives without the assurance that it will allow selective file deletion and recovery of the released data space, without the need to bulk-erase the whole disc.

#### CE no evil

Imagine the launch of a new VCR, which is sold with the disclaimer that it is not yet ready and the customer will have to upgrade chips within a few months: that is how Version 2 of the Windows CE handheld is being sold. There is also a good chance that this imaginary VCR will stop other equipment in the home working until the owner has identified the cause of the problem and made adjustments which put things back the way they were: that is how Psion is launching Version 2 of the software which connects the Series 5 to a PC.

The Windows CE handheld family is now ten strong. Original backers have been joined by Ericsson, Sharp and Novatel Wireless. Microsoft provides the OS, and has announced Version 2 with improved display standards and easier connection to a desktop. The CE software will not be shipped to handheld manufacturers until late this year, so everything bought before Christmas will have to be upgraded. How this happens, says Microsoft, is up to the individual companies.

In my October column, I wrote about how the readme files on the Version 1 CE HPC (Handheld PC) Explorer connection software warn of "serious problems" if people use the US-English version with any non-US-English (read British) Win95 PC. Microsoft's David Weeks just ducked my questions.

HPC Explorer is now being replaced by Windows CE Services Version 2.0. Jim Floyd, Microsoft's CE product manager at Redmond, admits: "We only ever made a US-English version of the HPC Explorer software. It was not tested for other language versions of Win95. We know that people used it without problems, but we didn't feel confident and wanted customers to be aware of the risks. Some manufacturers chose to ship handhelds to Europe, but they knew what the caveats were."

Floyd pledges that Version 2 is usable worldwide, without the risk of "serious problems". And, oh yes, another nice touch of Version 2 is that it's incompatible with Microsoft's Outlook Express, the default mail client which comes with Explorer 4, which comes with MSN's new Version 2.5 software.

Marketing manager Oliver Roll and director Judy Gibbons promise that MSN Version 2.5 "cuts confusion" so people can be "up and running within ten minutes". I tried it and got the all-too-familiar error internet mail messages: "Host POP3 could not be found...Host SMTP could not be found". MSN's helpline told me how to change the Tools/Accounts/Server settings to SMTP or POP3.email.msn.com, and then go online and use MSN Communicate to "migrate" my mail client from Exchange to Outlook Express. It makes AOL and CompuServe look so gloriously simple. No-one has yet been able to show me an easy way to make a handheld, either CE or Psion 5, send and receive email with AOL or CompuServe.

Although there are now ten CE licensees, Psion is still safe. The CE gang do not have any marketing policy and are fighting each other for market share instead of creating a new market to challenge Psion. Version 2 of PsiWin, the software which connects the Series 5 to a PC, works like Version 1. It defaults to a setting which continually scans all the Com ports on a PC and stops any existing internet or email software in



Barry Fox

## Straight Talking

Jam yesterday, jam tomorrow, but never jam today. Barry Fox casts a jaundiced eye over the marketing of version 2 software for Windows CE and Psion Series 5.

its tracks. Psion's product manager Daniel Doulton says this was a considered decision. Research showed that 90 percent of users don't know anything about Com ports and welcome the chance to plug in a lead and leave the PC to find the right port and connect. There is no paper manual for PsiWin but people who hit problems can search the electronic help file or print it out.

Is it true that only ten percent of users are using a modem? Even if it is true, why can't Psion offer an option: "Do you already connect to the internet or electronic mail with a modem?" What planet do these people hail from?

■ [100131.201@compuserve.com](mailto:100131.201@compuserve.com)

**I**t is accepted wisdom in business circles that technology shouldn't lead the market. You are not supposed to come up with a great new technology then think of a good reason for its existence. Instead, you identify a business need before finding or developing a technology to fit. But like every good rule, the landscape is littered with examples of it being broken. Never more so than in the intriguing case of the web and micro-franchising. The concept is exquisitely simple, and it could never have happened without the internet. It's a wonderful example of business win-win-win, where everybody involved gets something.

Let's take a concrete example. Say you've got a bookshop. However good your staff — and I am often pleasantly surprised by the quality of staff in a decent bookshop compared with most retailing — obviously, they cannot be experts in every subject. There are currently over a million books in print in the UK (without considering foreign imports): that's a tough product line to know thoroughly. This limited knowledge is going to be equally true in an online bookshop. Internet bookshops are very slick (have a look at Britain's BookPages at [www.bookpages.co.uk](http://www.bookpages.co.uk), IBS at [www.bookshop.co.uk](http://www.bookshop.co.uk) or Amazon in the US at [www.amazon.com](http://www.amazon.com)) but they can only wax lyrical on the obvious titles.

So how could internet bookshops attract customers away from the high street? Obviously there's the convenience of not having to fight through the crowds, especially when faced with the January sales. But what else? One way is to award loyalty points, like supermarkets. Another is to email you when new books, by a favourite author, come out. Yet the internet bookshops need more to help move buyers away from the tactile joy of browsing and flicking through real books.

Let's take a step back from the shop for a moment and consider the internet as a whole. The wonderful thing about it, which has made it into a superb research tool in the past couple of years, is the way in which it taps into pockets of expertise throughout the world.

Say you needed to investigate the history of paperclips. Someone, somewhere, is an enthusiast and has a real passion for paperclips. They will have amassed the sort of knowledge that you can't get by visiting the library (unless they've already written the definitive tome on the subject, and I can't see it staying on the bestseller list for long). The web gives them a chance to set up a paperclip site. Suddenly, you've got all the information you ever wanted — and more. But the enthusiast tends to be disappointed, because there are not many visitors to the site. The knowledge is there, but little used.

The final part of the equation is the potential customer. You know that Aunt Margaret has a profound interest in paperclips, but you've never managed to find a book that would interest a paperclip fan. You've tried the obvious ones like "Paperclips" or "101 things to do with a

paperclip" and drawn a blank. This is three groups of people with a need: net bookshops wanting a device to give them an edge, web-site owners wanting to add value to their site, and purchasers needing specialist guidance.

Enter the micro-franchise. The initial effort must come from the booksellers. They need to set up a mechanism enabling web-site owners to link to the shop and display details of a specific book. As an added incentive, they offer the web-site owner a small cut of the sales value — typically five to 15 percent. Any extra sales via this route and the booksellers are happy. The web-site owner provides information about the books available in a specialist area. The owner provides informed comparison and makes recommendations. And instead of simply providing a book list to read through and forget, there are buttons alongside each book to make an instant purchase if it proves attractive. The site becomes more interesting because it has more to offer (the bookshop may even publicise it) so the web-site owner is happy.

As for the purchaser, suddenly there's a helping hand. They now know the informed choice is between "The joy of paperclips" and "More than a loop of wire". They know that the first has the better illustrations and suggestions for practical things to make with paperclips, while the second has more historical detail and refers to all sorts of



Brian Clegg

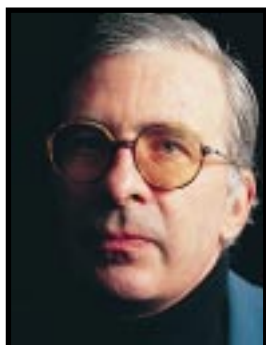
## Business Matters

**Everyone's a winner! The concept of micro-franchising between retailers and the internet is something everyone can gain from, says Brian Clegg.**

unusually-shaped paperclips. The purchaser is happy.

The brilliance of the micro-franchise lies in the relatively low investment for everyone — the enthusiast does most work, but wants to do it anyway — and the remarkable win-win-win outcome. Look out for other micro-franchises. Provided shops can overcome the urge to demand sole representation, I can see anything from a pottery micro-franchise to bonsai trees. For the moment, try [members.aol.com/cubooks](http://members.aol.com/cubooks) to see a bookshop micro-franchise dealing in science fiction and business/creativity.

■ [BrianClegg@msn.com](mailto:BrianClegg@msn.com)



Tim Nott

**A** month or two ago, the Nott communications facilities were looking rather ropery, centred around a slow, cash-guzzling 14,400 modem. Faced with the amusing choice between the two rival 56K technologies, neither of which are reported to work properly unless both ends have the right bits and pieces and the wind is in the right direction, I thought “stuff this, I’ll leapfrog straight to ISDN”. So, seeing that France Télécom (FT) maintains a showroom not five minutes from where I sit, I walked in and asked them to tell me all about Numeris, their ISDN service.

I’d forgotten about our local FT showroom. I think it must be where they send technophobes to recuperate after nervous breakdowns. A friend of mine bought a pager there. It didn’t work, so he took it back. “Yes, monsieur, we know it does not work. There is no coverage here.” “So why do you sell them?” “For passing trade, monsieur. Would you like your money back?”

I was passed on to a senior official who grudgingly admitted such a thing as Numeris might possibly exist and scribbled down the phone number of the area office, where They Know About Such Things. By now it was lunchtime — and for those of you unfamiliar with life in the Midi-Pyrénées, this entails a complete two-hour shutdown of all industrial, academic and commercial activity, with the exception of the catering trade. So I filled in the time with a little (slow) web surfing and shortly

phone line. Apparently, this all gets converted back to digital at the exchange, but as I am already pushing the envelope of my sketchy communications know-how, I’ll just say that although you don’t need a modem with ISDN, you can’t just connect your serial port to the box on the wall. You need an un-modem, or to use the technical expression, a Terminal Adapter.

Enter the Pace Ultralink Terminal Adapter. This looks uncannily like a modem, with a row of jolly little red lights at the front. Or rather, it does if I kneel down on the floor, because the serial lead is so short that I have to put the un-modem on top of the PC tower case, which is under the desk. Having run Setup from the accompanying floppy, I found I had some comms software that I didn’t need, but no driver. Perusing the manual from hell, which went rapidly from “how to plug it in” (which I’d figured out) to “AT#ippots1=0” (which I’d really rather not know about) left me none the wiser. In any event, installing it as a Generic Modem under Windows 95 worked. Re-reading the manual and contacting the Pace technical support revealed that a specific driver (or rather, a setup file) was supplied on the disk, though apparently this was a closely-guarded secret.

Later, I had the correct setup, er, set up, and “Pace Ultralink ISDN TA” appeared proudly in all the dialog boxes as it should. The only teensy-weensy snagette was that it had stopped working. There followed a long, unproductive exchange with a patient and helpful Pace support person, during which I used a lot of Hayes commands and other bad language.

Eventually, for completely unconnected (no pun intended) reasons, I reinstalled Windows, then reinstalled the Ultralink. It worked beautifully, first time. Dialling is instantaneous, and data transfer on a good day is spectacularly fast. I’m still looking for the ISDN grail, which is an ISP that will let you couple the two channels to get 112Kbps transfers, but even 56Kbps is an improvement.

# From the desktop

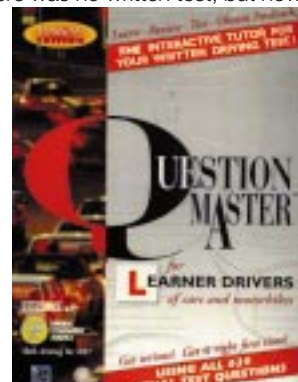
The great leap from clapped-out modem to ISDN *chez* Nott was not without incident, particularly when the un-modem — sorry, *terminal adapter* — turned up.

found the France Télécom web site which told me everything I needed to know, and in English, too.

Unlike its British counterpart, France Télécom seems to have its ISDN marketing sorted out (although I wish it would tell its local branches). Ten days later, I had a large box on the wall. This services two voice lines (keeping the previous numbers) and a new, data-only line. All for a one-off charge of around £60 and a rental of £20 per month for the three lines. There remained the slight technical problem of connecting the PC to the box. As you may know, modems convert digital information to the analogue squeaks and whistles which go down the

## Hard drive

I once had a friend whose business plan to start a “fast-learning” driving school fell over at the first fence. No-one, it seemed, wanted to enroll at his school of motoring. In those days, of course, there was no written test, but now the terrors of the exam room are added to the ordeal of the practical test. This month brought two CD-ROMs offering crash courses on the theory part of the UK driving test. The Question Master has the Driving Standards Agency (DSA) seal of approval, but failed to



get mine by putting lots of files in my Windows\System folder, making copious changes and additions to the registry and not providing an uninstallation routine.

Apart from that, there's not a lot to say. You can "Look and Learn" by topics such as Hazard Awareness or Signs and Signals, test your knowledge on the same topics with a reveal button to check your answers, or take a simulated test. It's all a straightforward multiple choice, but it only tells you what is right, not why.

On the other side of the street, Pass First Time Theory Test carries not just the DSA seal but those of the RAC, the Institute of Advanced Motorists and the Driving Instructors' Association. The packaging also carries an endorsement from the British Dyslexia Association Computer Committee and a picture of a small elephant named Ben. Ben represents the Motor and Allied Trades Benevolent Fund which gets a penny for each copy sold. Like Question Master, it runs on both Windows 3.1 and 95, and doesn't come with an uninstallation routine. It did, however, escape The Wrath of Nott by confining its business to its own folder and leaving the registry alone.

It's a lot more ambitious than Question Master, with a multimedia interface, cute little animated icons, and videos of a man with a bad haircut and a worse tie who introduces the program and explains various aspects. This is reassuring, as it is well-known that all good driving instructors have bad haircuts and worse ties. It's also much more instructive on the theory and practice of hazard recognition. There are pictures and videos where you need to click on potential hazards within a time limit, and it can get quite tough. The actual test and preparation are, again, multi-choice questions but the practice section has explanatory hot-links to the relevant section of the Highway Code. Which makes it about five-nil to Pass First Time Theory Test.

### Greatest hits

What goes around, comes around: and sometimes sooner than one expects. So it was with rather grim curiosity that I opened the INXS Interactive Songbook, just three days after the life of singer Michael Hutchence was so inelegantly wasted. Based on the 1994 Greatest Hits album, it comes on two CDs from Europress. There's discography, biography, videos both of the songs and interviews with the band members, press cuttings and more fan fodder. Despite the two disks (and 30Mb of hard disk space) the videos are of poor quality and — *pet hate alert* — you have to drop your display depth to 256 colours.

The heart of the matter is the songbook itself. Pick a track and you get the choice of keyboards, guitar or

vocals. The first two give you the chance to tune up and learn the chords used in the song before plunging into the play-along. This latter just shows the words and the chords: there's no musical notation or representation of any other parts, so if you want to learn the solos, you'll have to do so by ear. Furthermore, you're stuck with keyboards and guitar (irrespective of whether there's a keyboard track on the song) so forget those saxophone breaks or bass lines.

Blur's Parklife (three CDs) is also in the same series, and same format, with a few more diversions. There's a sort of monopoly board affair that takes you at random to various activities. As well as all the mainstream fan stuff, you can play Parkman, which is like Pacman only played in a park with dogs chasing the protagonist. You can also go dog-racing or watch Chelsea FC on television in the company of two strange animated puppets and their beer cans. And, of course, you can sing and play along with All-Bran and chums. Other titles in the £29.99 series include Oasis (What's the Story, Morning Glory?) and U2 (Achtung Baby). It's all much more fun than learning your Highway Code or struggling with un-modems.

### Honestly, I don't make these up...

Seasoned Microsoft (MS) publicity watchers will no doubt remember the use of the Rolling Stones' song, Start Me Up, in the Windows 95 launch frenzy. At the time it was apparent that nobody in the publicity machine had listened to the entire song, particularly the bit that goes, "You make a grown man cry". Since then, according to my reliable TV-watching sources, MS has moved upmarket. The recent TV campaign for Internet Explorer 4 has Mozart's Requiem as background music. As the well-known phrase "Where do you want to go today?"™ appears on the screen, the choir is singing "*Confutatis maledictis, flammis acribus addictis*" which translates as "the damned and accursed are consigned to the flames of hell". Have a nice month, now.



### PCW Contacts

Tim Nott is at [timn@cix.co.uk](mailto:timn@cix.co.uk)

Europress 01625 859333

[www.europress.co.uk](http://www.europress.co.uk)

Pace Consumer Electronics

[www.pacecom.co.uk](http://www.pacecom.co.uk)

Pass First Time from Licence to Drive  
01484 400399

Question Master from Computech  
01978 312372





# Letters

Send your letters to:

**The Editor**  
**Personal Computer World**  
**VNU House**  
**32-34 Broadwick Street**  
**London W1A 2HG**

or email  
[letters@pcw.co.uk](mailto:letters@pcw.co.uk)

or fax **0171 316 9313**

**In last month's PCW we gave the participating companies in our undercover PC group test (Dec '97 issue) the right to reply. The letter reproduced below arrived too late for inclusion in our January issue's Letters.**

■ **From: Fox Computers**

Concerning PCW's undercover review, I would like to thank you for the chance to submit a Fox machine and the opportunity to voice an opinion on the review results.

Fox Computer Systems fully supports the nature of "blind" reviews because we believe they are the only real way the general public can receive a genuine and unbiased picture of a company and its products.

However, we are obviously disappointed not to have performed to our normal technical-support and quality-control standards. We continually strive for the highest standard, and while every system undergoes vigorous quality checks, we are unable to control the way in which couriers handle consignments.

A cable dislodged in transit is regrettable, but unfortunately these things can happen. We are currently investigating an effective technique to ensure that this will not re-occur.

Like every technical-support department we have "hot" periods where phones are busy, and at these times we concentrate all available personnel on support. While the

support phone line is answered on average within two minutes, we are looking at further ways of improving efficiency as well as increasing technical support staff.

**Chris Clark**  
**Managing Director**  
**Fox Computer Systems**

**Game on**

I have read numerous reports about the Cyrix K6 being faster than the Intel Pentium equivalents, so why does my Intel Pentium 233MMX run Quake and a load more games faster than the K6-233 which I tested in the same system?

I suspect it is due to the K6 having a weaker FPU, and if that is the case, wouldn't it be worth the extra £20 to get the Intel chip, because I for one only have a chip running at 233MHz for playing games? If I were just doing family finances and the odd letter, I wouldn't need more than a Pentium 100MHz.

**Will Lean**  
[wjlean@hotmail.com](mailto:wjlean@hotmail.com)

*You are absolutely correct about Intel's MMX Pentium having a stronger FPU. If games are your forté and you want the best possible performance, then the Intel MMX Pentiums are the way to go. Nonetheless, the K6 is an excellent processor and if you're willing to accept a performance deficit of between eight and ten percent on games, we'd say go for it.*

**Bug stings**

There have been several suggestions made about software houses using buyers to debug programs for them. I have just discovered a small but irritating bug within the latest edition of Lotus 1-2-3.

Having spent several hours using the Lotus web site looking for fixes or workarounds, I gave up and telephoned the Customer Support Services.

Apparently, my free support expired one month ago, so just to tell them that there was a bug was going to cost me money. I was referred to the fax-back

## Many happy returns

May 1998 sees the 20th Anniversary of *Personal Computer World*. Yes, we're older than the original IBM PC! To celebrate, we're putting together a special issue, and you can help. We're looking for long-term readers of PCW, or anyone who's been involved in the IT industry in some form, to write and tell us how it's changed over the past two decades: which systems, software or events stood out and changed the way you work.

Please write to us at the usual *Letters* address (left). Your contributions will be most welcome. And don't forget to vote in our 1998 Awards (p136) for the chance to have your say and win £1,000-worth of PC equipment of your choice.

service but even though I told them I had checked out all the web-based information, they still would not let me report this bug without charging me for their time.

This is exactly the sort of customer service that is going to make me change to another company's product. I do not think Lotus is in a strong enough position to lose support from its users, many of whom have stuck with the company for ten years. With many products offering almost identical power and functionality, we can vote with our feet or, in this case, money.

**Dr Steve Mudge**  
[s.m.mudge@bangor.ac.uk](mailto:s.m.mudge@bangor.ac.uk)

**Terry Clearkin,**  
**European Support**  
**Operations Manager,**  
**Lotus Development, replies:**  
*It is with much regret that I read the letter from Dr Mudge and in*

*particular I regret what appears to have been a simple mis-communication issue.*

*Lotus has never had any policy to use customers to debug our software other than through formal beta software programs where we contract specifically with a strictly limited number of high-usage customers to undertake acceptance testing in a controlled environment, with suitable backup from Lotus.*

*Similarly, it is not Lotus policy to charge our customers simply to report bugs in our software. Any Lotus customer can report a software bug to Lotus Customer Support, in writing, irrespective of their entitlement to telephone-based technical support services.*

*Lotus Customer Support will undertake to extensively research such reports and feed back interim solutions or workarounds only for those*

*customers who are entitled to support under our complimentary or contracted support programs.*

*I very much regret that our policy does not appear to have been clearly explained to Dr Mudge in this instance when he contacted us. I have taken corrective action to ensure that our service-line staff are fully conversant with this policy in order that we can avoid misunderstandings of this nature in future.*

*We very much value the loyalty of our customers and share their strong desire that they gain maximum usage and value from our products. Therefore, we provide a range of very competitively-priced support services to assist them with any problems or queries they may have with our products after the initial period of complimentary support has expired.*

### **Mind your language**

Brian Clegg, in his "Business Matters" column (PCW, Nov '97) clearly shows that he doesn't understand why people want to use software in languages other than English. I have lived and worked in several countries and can assure you that many people may be proficient software users with a good education, but would still be reluctant to use English-language software because they would not understand it sufficiently to be comfortable using it.

Trying to sell these people US software is very arrogant. In places like Cairo, where I am now, Arabic is the only language with which the vast majority of people will ever come into contact. Apart from language, software also needs to be localised, to be able to handle other alphabets and date formats. In the multimedia

p68 ➤



**Egyptian software users wouldn't want English-language versions**

*practice), the obvious candidate, particularly so given the web, is English. My mistake was using the illustration of the global launch of software. I absolutely accept that software has to be localised, so it wasn't a great example. I should have stuck to communications.*

industry, software may also have to be adapted to take local sensitivities into account.

The main reason why major software companies are investing such a lot of money in localisation is not because they are worried about linguistic and cultural diversity, but because they have understood that it makes sense business-wise to give the customers what they want, and that is why localisation is such a booming business. In a similar development, Motorola never sold many pagers in China, until it began to sell models which supported Chinese characters...!

**Bart**  
(email address unknown)

**Brian Clegg replies:** *I agree with everything Bart says, particularly about the need to avoid acting as if the whole world were America. The concept of the "global village" is entirely misleading; it is essential to take local requirements into consideration.*

*Having said that, there is an argument for having a recognised world language to overcome the cost of communications. Just as India uses a single language for legislation, to overcome the variety of languages spoken there, I would argue that the EU, say, would benefit from a similar approach. Given that concept, and putting aside local prejudice (impossible in*

**A quantum leap**

Having logged in to the Microsoft web site to ensure I had downloaded the last update for Cinemania 97 CD, I got the message, "You're already up to date! Check back on 02/05/2036 for new reviews, biographies, articles and web links".

**Les Kneeling**  
[les@lesk.demon.co.uk](mailto:les@lesk.demon.co.uk)

**This service is unavailable**

British Telecom has been hard at work selling ISDN to small businesses as being great for multimedia and the internet. And you can "make and receive calls...as usual".

No you can't. Many owners of small businesses rely on BT's excellent Select Services like Call Return (find out who last phoned), Call Waiting and, most importantly, Call Diversion. What BT doesn't tell you is that when you transfer your existing phone line to the port at the back or your new ISDN adapter, none of these services are available: you cannot forward calls to your mobile or home and cannot even Press 5 if a line is engaged to have it automatically recalled.

BT ISDN says diversion services are

available on speech calls. No they are not, or at least not in the way we have become used to. You can only do it for the whole ISDN line (voice, fax and data), 24 hours in advance.

This is hopeless for small businesses, many of which rely on fast phone diversion when called out. BT's ISDN literature is misleading and economical with the truth in this area, and possibly verges on a breach of the Trades Descriptions Act.

**Brian Champness**

**Clive Akass writes:** *BT's record on ISDN is not a happy one and misleading advertising does not help. However, PCW has been told that Select Services will be available, in 1998, on a new hybrid service offering both an analogue and ISDN connection (see Newsprint, Jan '98). This will be cheaper than an ISDN installation, although some ISDN features will not be implemented.*

**Give Xerox some credit**

I enjoyed your *Retro* on the Apple Lisa (PCW, Dec 97) but felt a twinge of "What about us?", as would many current or ex-Xerox employees. OK, fair enough, if you can't bolt it to a photocopier, Xerox can't sell it, but if I am not mistaken, it actually had a working GUI PC as early as 1978, well before

**The Canon MultiPASS 190 multi-function device (reviewed in First Impressions, PCW, Jan'98)**



Apple started producing its lemon. If truth be told, that's where Apple nicked its design team from.

Let's take a moment to remember that as well as giving me £300 per term while I was at university (bless 'em), Xerox has also come up with some very cool stuff. The whole Windows/Icons/Mouse concept is a Xerox brainchild, along with many other vital technologies including fax and ethernet. It's just a shame it never made any money from them.

**Keith Hunniford**  
[keith@yours.com](mailto:keith@yours.com)

**Unfair to MFDs**

You appear to be particularly harsh on Multifunction Devices (MFDs) in your *No-nonsense Buyer's Guide*. The criticism "if your MFD breaks down, you won't be able to print or receive faxes" is unfair: when any technology breaks down it is unable to fulfil its design purpose.

I understand what you mean about the "eggs in one basket" problem, but your criticism seems to be more techno-fear of the unnaturalness of a printer and fax in the same box, than a valid argument against MFDs.

**Alastair Somerville**  
[crown\\_nail@compuserve.com](mailto:crown_nail@compuserve.com)

*We have nothing against the concept of integrating several peripherals into one handy multifunction device, but most attempts so far have fallen short in some respect.*

*Usually, the printer is based on last year's engine, the scanner is frequently monochrome only, and, more often than not, the fax portion only works when connected to a PC with suitable software. Taking all this, coupled with the fact that if one part fails you effectively lose all your devices, the phrase "missed opportunity" springs to mind.* ■

# Gadgets

Compiled by Adam Evans. Photography by David Whyte.

## AVIGO

Hot on the heels of the Palm Pilot comes the AVIGO from Texas Instruments. This sexy-looking PDA has 1Mb RAM and a large rotation display with a backlight for improved visibility. It contains an address book, schedule planner, memo pad, expense manager, data table, calculator and password protection. Data can be synchronised with Lotus Organiser 97, which is included in the package, as is a foldable docking station, and is input by pressing on the picture of a keyboard displayed on the touch-sensitive screen. The AVIGO is available from all branches of Dixons and Staples.

**Price** £229 (£194.89 ex VAT)

**Contact** Texas Instruments 0181 230 3184 [www.ti.com](http://www.ti.com)



## Drum X

DrumX is a terrific idea for all would-be drummers. It is a touch-sensitive console, set out like a conventional drumkit, and replaces your usual mouse mat. There are six pre-programmed drumkits to get you started, including orchestral, power, electronic and jazz (nice). You can link it up with other MIDI devices and choose from up to 120 percussive instruments on the 15 touch-sensitive pads (terrific!). Best of all, it comes with a pair of real drumsticks (great!) so you can start playing along with all your favourite tracks, straight away (*smokin'!*).

**Price** £49.95 (£42.51 ex VAT)

**Contact** Simmons Drums 0500 222220 [www.simmonsdrums.com](http://www.simmonsdrums.com)



## SoundWorks speakers

Big is not necessarily so beautiful in the world of quality audio, as these new speakers from Cambridge SoundWorks prove. These tiny satellite speakers complement an enormous subwoofer which contains three power amplifiers. These SoundWorks speakers can play far louder than conventional models because the low bass is reproduced by its own dedicated amplifier. If the subwoofer is overdriven, the resulting high-frequency distortion components never reach the separately powered speaker cubes and so cannot be heard. All this technical gubbins adds up to producing great-quality audio from speakers that are small enough to fit just about anywhere. What more could you want from a sound system?

**Price** £139 (£118.30 ex VAT)

**Contact** Creative Labs 01245 265265 [www.creativelabs.com](http://www.creativelabs.com)

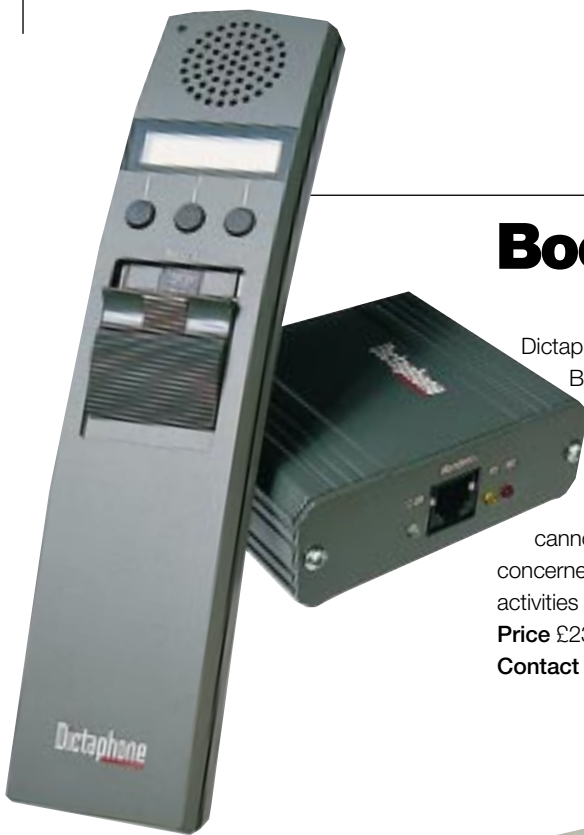


## Business Card Reader

The average person is given over 60,000 business cards every year. Actually, we made that statistic up, but it certainly feels like a lot and it's a real pain keeping track of all the details. The introduction of this new scanner by Seiko may be the answer to all our troubles. Simply dropping a business card into the slot activates the scanner which, in combination with some cunning software, reads the data on the card and places the information into the right database fields. You can use the supplied contact management software or transfer data to a variety of contact applications such as ACT! and Maximizer.

**Price** £190 (£161.70 ex VAT)

**Contact** Seiko 01628 410357 [www.seikosmart.com](http://www.seikosmart.com)



## Boomerang

Dictaphone invites you to bring the "Power of Voice" to your computer with its Boomerang voice system. Allegedly, its messaging protocol can turn your PC and network into a powerful "voice delivery machine": sounds impressive, doesn't it? Essentially, the system allows you to dictate voice messages into your PC and then either send them across your network to be typed, or across the internet to be enjoyed by the world at large. Here at PCW we cannot quite work out the advantages of emailing voice messages. As far as we're concerned, listening to a long-winded answerphone message is one of the duller activities on earth.

**Price** £232.65 (£198 ex VAT)

**Contact** Dictaphone 0171 878 5000 [www.dictaphone.com](http://www.dictaphone.com)

## ErgoPro Keyboard

The terrible thing about an ordinary computer keyboard is that it has been specially designed to be difficult to use. The early mechanical typewriters were prone to jamming if you typed too quickly, so the keys were purposely laid out in a random pattern. Despite the development over the years of several different types of keyboard, each designed to make typing easier and faster, the Qwerty keyboard remains the standard throughout the world. This new keyboard from Fujitsu could take some of the sting out of typing, with its clever ergonomic design. And, as a bonus, it looks really cool too.

**Price** £64.63 (£55 ex VAT)

**Contact** Fujitsu 01344 475000 [www.fujitsu.com](http://www.fujitsu.com)



# First Impressions

**KT's AGP notebook** sticks to the budget; printing in the office perks up with **HP's new LaserJet**; digital cameras from **Agfa** and **Casio** are finger-clicking good; the aroma of **JavaBeans** pervades the new **Visual Café**; and **First Aid 98** fixes it.

## ■ Hardware

# Carrera Power Media 266

Packed with features and sporting a new IBM processor, this high-end PC is an upgrade dream.

**C**arrera's Power Media MX-PR266 incorporates IBM's brand-new PR266MX processor and an Intel 430 TX chipset. The inclusion of the IBM processor shows a commitment to the continuation of the Socket 7 processor interface, allowing for a wide range of upgrade opportunities without being restricted to Intel products utilising the new Slot 1 connector.

The pre-production model we saw arrived in a large tower case with plenty of room for expansion. One free external 3.5in, one free 5.25in and one free internal 3.5in bay as well as one PCI, one ISA and one shared slot crying out to be filled, offer plenty of opportunity to upgrade at a later date. The two 168-pin SDRAM expansion slots, one of which is free, or four 72-pin SIMM sockets, all of which are free, allow for the 64Mb RAM to be upgraded to a maximum of 256Mb, and the system also incorporates 512Kb pipeline burst synchronous secondary cache.

Opening the case reveals a very tidy interior, with all cables, including the CD audio cable

which in many other PCs is often dragged across the free expansion slots, clipped neatly to the side of the case. Both the memory and the processor are unobstructed and accessible to facilitate easy upgrading. The hard drive, a 4.2Mb Wide SCSI Seagate drive that achieved a data transfer rate of 5.2Mb/sec in our tests, is easily removed using the docking case with integrated handle, while the 24-speed CD-ROM drive transferred data at a rate of 2.3Mb/sec. The full-size ATX motherboard, with matching power supply and large tower case, supports two UART 16550 serial ports for fast data communications and a range of "PC Health Monitoring" options including hardware BIOS virus protection and overheat control alarms.

The serial ports are supplemented by a couple of Universal Serial Bus sockets, which will allow for the connection of USB devices as they become more common in the future.

Graphics, delivered courtesy of an ATI XPERT@work card with 4Mb on-board SGRAM, are clear, sharp and steady on the Iiyama Vision

Master 17 monitor which offers a flicker-free image even at resolutions as high as 1,280 x 1,024 pixels. At a refresh rate of 85Hz on a resolution of 1,024 x 768 we found that it was pleasant to use for extended periods during our tests. The facility to double the graphics card memory to 8Mb will enable users to display a wider range of colours at a higher resolution should they so desire.

A 16-bit Creative Labs SoundBlaster AWE 64 card handles sound, producing rich and satisfying output at a wide range of volumes through the bundled Altec Lansing Power Cube speakers at a maximum of 6W from each satellite speaker and 20W from the woofer. It is both SoundBlaster 16 and, through the incorporation of Wavetable features, AWE 32 compatible. The keyboard, a large KeyTronic model, was sturdy and comfortable to use, giving satisfying tactile feedback throughout our tests, while the mouse was the contoured model from Microsoft which has now become all but standard for bundling with high-end PCs.

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## VNU European Labs



VNU Labs tests all kinds of hardware and software, from PCs to modems to databases. All our tests simulate real-world use and

for the most part are based around industry-standard applications such as Word, Excel, PageMaker and Paradox. Our current PC tests for both Windows 95 and NT are the Sysmark tests from BAPCo. In all our performance graphs, larger bars mean better scores.

## Ratings

- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended

An internal 56Kbps Rockwell modem was included and configured to use COM3, leaving the two serial ports free for external connections, while a Diamond Multimedia FirePort SCSI host adapter offered further opportunities for peripheral attachment. The box also contained a copy of SuperVoice software for data, voice and

fax communication, along with a one-month CompuServe trial.

The user manual is well written and easy to follow, and is also included on the hard drive as a Windows help file so that it can always be kept to hand and searched for keywords. All sections relating to upgrading or changing the system configuration are helpfully graded according to the level of experience necessary, so that even novice users can feel confident that if they start out on many of the projects, they should have no trouble in achieving successful results.

Bundled with Lotus SmartSuite 97, which is pre-loaded to get you up and running from the word "go", this is a very impressive package. Although some scorn the Cyrix chip, IBM's dedication offers it an air of validity, and its performance matches that of other non-Intel products. A 233MHz Cyrix chip (PCW, Sept 97) achieved the same benchmark score as a similarly-specified AMD K6-233 (PCW, Aug 97). It is also fully MMX-compliant,

cheaper, and with 64Kb incorporates twice as much L1 cache as a Pentium 2.

On the downside, there are currently very few Socket 7 motherboards incorporating an AGP slot and this PC is no exception. As a result, the graphics card takes up a valuable PCI slot and runs at a maximum of 66MHz rather than the potential 133MHz available with an AGP card.

Nik Rawlinson



## PCW Details

**Price** £2,579.13 (£2,195 ex vat)

**Contact** Carrera 0171 830 0486

[www.carrera.co.uk](http://www.carrera.co.uk)

**System Reviewed** IBM PR-266, 4.2Mb SCSI HD, 64Mb RAM, 17in monitor.

**Good Points** User manual. Graphics. Keyboard.

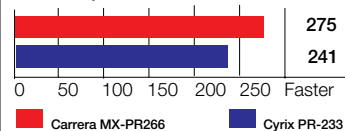
**Bad Points** No AGP.

**Conclusion** A feature-packed PC.

★★★★

## Performance results

BAPCo Sysmark Windows 95 test scores



## Hardware

# KT Micro AGP

Watch those graphics go! This Socket 7/AGP PC is a real fast worker, for those with limited funds.



support ACPI (Advanced Component and Power Interface), a new power management standard for desktops, notebooks and servers.

Developed jointly by Intel, Microsoft and Toshiba, ACPI lets the user put a PC into sleep mode and turn peripherals off when they are not being used.

It also allows more remote control of your PC.

The wide support for peripherals offered by the Apollo VP3 chipset is good

news for users who don't want to buy a whole new PC just for its AGP capability, although you will still need to get hold of a new motherboard.

KT Computers was the first manufacturer to send us a machine built around a Socket 7 with AGP motherboard, and so the Micro AGP attracted some attention when it arrived in the VNU Labs. Making use of the Apollo VP3 chipset, the VIA P55 VP3 motherboard has an AGP slot and a Socket 7 CPU: in the case of the Micro AGP, this is a Pentium 233MHz MMX. We were initially surprised that KT had opted to use the Intel processor rather than an AMD K6. In fact, KT is offering both chips and there is no price difference, but on this particular motherboard the Intel offers better performance. KT does concede however that most users will want to upgrade to the new 300MHz and 333MHz Socket 7 processors coming from AMD in the new year, which will offer a significant price advantage over PII chips of the same clock speed.

The Micro AGP ships with an excellent Sony Trinitron 15in monitor. The controls are not adjusted using an on-screen display and the picture does suffer from moiré, but focus is exceptionally crisp and the colours vibrant.

Powering the display is a Diamond Viper V330 AGP graphics card. In our last graphics card group test the PCI version of this card was the fastest PCI card we tested. This AGP version has 4Mb of SGRAM and uses the same super-fast nVidia Riva 128 graphics accelerator as on the PCI version, and so produced a blisteringly fast score of 50.75 images per second in our Final Reality benchmark. Now that the graphics card has moved on, all four of the PCI slots are free. We were also happy with the AWE 64

sound card and the K56 modem.

Making the most of the chipset's capabilities, KT has installed a 2.5Gb UDMA hard drive. There's 32Mb of SDRAM installed in one of the three available DIMM slots, and 512Kb of on-board cache memory. This motherboard also has two SIMM slots, presumably provided for users buying the motherboard as an upgrade path, as you can't use both SIMMs and DIMMs simultaneously. The CPU is located under the power supply, which makes it a bit tricky to get at, although there shouldn't be any problems installing extra memory modules.

Lynley Oram

This last year has seen 3D graphics coming of age. But PCI, with its 33MHz bus speed and 132Mb/sec peak data transfer speed, almost groans when faced with the task of 3D rendering and has to rely heavily on the CPU. The solution is a dedicated graphics bus — AGP (Accelerated Graphics Port), which has a bus speed of 66MHz and a peak data transfer rate of 533Mb/sec. It also has the entire bandwidth to itself and does not have to share it with other PCI components.

The snag is, until recently, only Pentium II-based PCs with their Slot One design, and also with the Intel 440LX chipset and an AGP slot on the motherboard, supported the standard. As Intel's rivals, AMD and Cyrix, have been bringing out Socket 7 based Pentium-with-MMX standard processors, Intel has not been keen to develop a chipset for Socket 7 which supports AGP.

AGP is ideal for anyone who is into serious 3D gaming or needs workstation graphics power for 3D programming and animation, but AGP cards cost no more than the equivalent PCI-based card. Up to now, anyone who wanted the ultimate games machine but who is on a budget, was torn between having to fork out serious lucre for a PII or settling for less powerful 3D graphics on a Socket 7 machine. But the battle is not yet over for Socket 7 chip manufacturers, as VIA has released a new chipset, the Apollo VP3, that supports AGP on a regular Pentium-class Socket 7 motherboard. This chipset also supports Ultra DMA (also known as Ultra ATA), hard disks, SDRAM and USB. Under Windows 98 it will also

## PCW Details

**Price** £1,291 (£1,099 ex VAT)

**Contact** KT Computers 0181 961 8897  
[www.bt.internet.com/~ktweb](http://www.bt.internet.com/~ktweb)

**System Reviewed** Intel P233MHz MMX, 32Mb SDRAM, 2.5Gb HD, 24X CD-ROM, 15in monitor

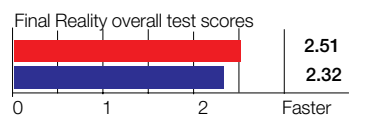
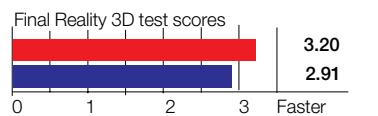
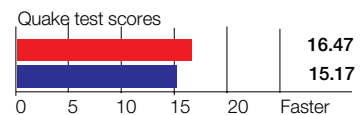
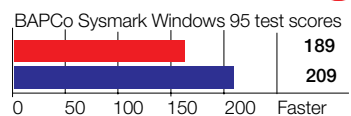
**Good Points** Fast graphics. Socket 7/AGP motherboard.

**Bad Points** Overall performance was disappointing, given the AGP card.

**Conclusion** A good graphics machine for those on a budget.

★★★

## Performance results





## Hardware

# AJP 85-233MMX

Power dressing the PC way with this notebook that will be the perfect presentation partner.

**I**f you thought 14.1 inches of screen on a notebook was too large and just a touch decadent, you are not going to like this AGP notebook. Its screen is a whopping 15.1in TFT which runs 1,024 x 768 in millions of colours in glorious style. It should be said that the term "portable" does not really apply here. The 85-233MMX is intended as a desktop replacement for the power user, someone who needs to take it from, say, his or her desk to use as the ultimate presentation tool.

The extra space afforded by the screen does allow for a few nice touches. There is ample space for both a CD-ROM and a floppy drive, and there is also room for a separate keypad, which is useful for accountants and anyone else who works with figures.

The processor is a desktop P233MMX. Although I do criticise manufacturers who put desktop chips into mobile computers, in this instance AJP gets away with it. The power consumption of the chip is not really an issue as the screen is by far the greatest power drain, and as it is designed to sit on a desk, plugged into the mains all day, a desktop chip is just as easy to

use. The problem of potentially damaging heat created by

desktop chips is also sidestepped by the sheer size of the notebook. In a case this large you have far more room to circulate air without the need for a noisy fan. In fact, when running our benchmark tests, which last for several hours, the notebook never



got more than slightly warm to the touch.

The inclusion of 512Kb L2 cache, 64Mb of RAM as standard upgradeable to 128Mb, a 3.2Gb hard disk and 4Mb of video RAM makes for a good spec.

Power is provided by a 15-cell lithium-ion battery. There are good-sized speakers, but most of all, the test score of 188 was better than any other 233MMX notebook, Tillamook or otherwise, we have seen.

Adele Dyer

### PCW Details

**Price** £3,025.63 (£2,575 ex VAT)

**Contact** AJP 0181 452 9090 [www.ajp.co.uk](http://www.ajp.co.uk)

**System Reviewed** P233MMX, 64Mb RAM, 3.2Gb HD, 15.1in TFT screen.

**Good Points** Huge and splendid screen. Good performance.

**Bad Points** Desktop chip, but it gets away with it.

**Conclusion** An excellent desktop replacement.

★★★★

# Digital HiNote Ultra 2000

Digital hits the style high notes with this very good-looking high-function notebook.

**T**he original Digital HiNote Ultra caused a bit of a stir when it was released, as it was then the slimmest, lightest and cutest notebook on the market. The new Ultra 2000 takes the basic design principle of a slim, lightweight notebook but with everything you would expect from a desktop, designed for a businessman who travels widely but still needs the power of a high-function notebook. So instead of including the CD-ROM and floppy drives in an add-on base unit, the CD swaps with the floppy drive in a modular bay and the screen has grown from a small 10.4in model to a whopping 14.1in XGA TFT. The thin design does mean some things are compromised, such as not being able to use the floppy and the CD drive simultaneously. Digital assures us that on the models it is selling, you can warm and hot-swap the CD and floppy, although we had problems doing this.

The Ultra 2000 is powered by the last generation of non-Tillamook mobile Pentiums, a P166MMX. Digital says it will be announcing models with faster chips next year, but is not specifying which processors. The mobile chip is not mounted on a mobile module as this takes up

too much room to fit into such a slim machine. The 2000 comes with 32Mb of RAM

as standard and the model we tested had an EIDE hard disk divided into two partitions of 1.58Gb and 1.43Gb. The benchmark score of 122, however, was quite low. There is CardBus support from the two Type II PC Card slots and a built-in 33.6Kbps modem,



which can be upgraded to 56K. However, overall the performance was a little disappointing, with the benchmark scores being quite low and occasional problems with the notebook restarting after each run of the tests.

The design is sparse and modernist with a wide wrist-rest, and it all works together to make the whole look very stylish. The trackpad was responsive: in fact, it was a little too responsive, as it was all too easy to double-click by mistake.

Adele Dyer

### PCW Details

**Price** £5,286.33 (£4,499 ex VAT)

**Contact** Digital 0345 227228 [www.digital.co.uk](http://www.digital.co.uk)

**System Reviewed** P166MMX, 32Mb RAM, 3Gb HD, 14.1in TFT screen.

**Good Points** Looks fabulous.

**Bad Points** A few performance niggles.

**Conclusion** Seriously stylish, although compromises have to be made for this.

★★★★

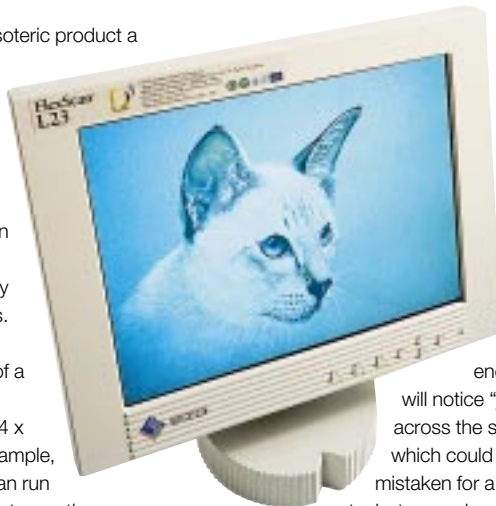
## Hardware

# Eizo FlexScan L23

A flatscreen PC that will put some seriously good colour into your life. The future looks bright!

**F**rom being a rather esoteric product a few months ago, flatscreen monitors are now almost run of the mill, with most PC manufacturers offering the choice of a flatscreen in their bundles. The FlexScan L23 is the first flatscreen from Eizo, which is known for its high-end monitors aimed primarily at the graphics and CAD markets. The screen on the L23 is 13.8in diagonally, about the equivalent of a 15in CRT monitor. It has a recommended resolution of 1,024 x 768 and a dual input, so if, for example, you have a Mac and a PC, you can run both off one screen and switch between them with one button on the front. However, as Eizo uses a non-standard male-to-male video cable, you will have to order a second cable for £49.

As with most TFTs, the monitor runs at 60Hz. This should be flicker-free, as the transistors which light each pixel should not dim quickly enough for you to notice flicker across the



screen, even at a refresh rate that would have your eyes aching on a CRT. If your graphics are not good enough, you will notice "jitter" across the screen which could be mistaken for a low refresh rate, but a good-quality graphics card will see off this problem.

The controls on the front are kept to a bare minimum. There are four little buttons for brightness and contrast and one enter key to set these as default. There is one button to switch from one input to the other and you can set a priority input, although if one machine is off, the

screen automatically switches to the other input. All other functionality, including three colour temperatures, a colour enhancement button and border and black intensity, are controlled by the four buttons and the enter key via the on-screen display. What really marks out this screen is its quality. The image is incredibly sharp and the colours are bright and vibrant. In fact, although it is slightly smaller, it compared very favourably with the NEC MultiSync LCD400 which was awarded Editor's Choice in our October issue.

Adele Dyer

### PCW Details

**Price** £2,102.08 (£1,789 ex VAT)

**Contact** PDS 01483 719500 [www.eizo.com](http://www.eizo.com)

**Good Points** Sharp, great colours.

**Bad Points** Like all flatscreens, it is not for paupers like me.

**Conclusion** One of the best flatscreens on the market.

★★★★

# HP LaserJet 4000 TN

Hewlett-Packard's JetSend technology makes a safe landing in the 4000 TN laserjet printer.

**A**s the first product designed specifically to utilise HP's JetSend technology, which lets peripherals communicate directly without a PC, this workgroup printer promises a lot. It is network-ready with two 250-sheet paper trays, but its strength is a 100MHz RISC processor and 8Mb RAM, upgradeable to 100Mb. Optional extras include duplexing modules and small hard drives, while a spare port lets third-party manufacturers build paper-handling facilities that can be bolted directly onto, and controlled by, the 4000. A single CD, which checks HP's web site for more up-to-



date drivers, takes care of installation, although downloading was fairly slow, even on PCW's leased line. Output quality was outstanding. 220 levels of grey ensured clear gradation in shaded tones and smooth light-to-dark transition without stepping or banding. Large areas of black had slightly variable densities, but there was clear differentiation between a selection of bars shaded in ten percent increments. Straight, curved and diagonal lines had smooth edges, and circles were true and well proportioned. The driver allows for up to nine pages to be printed on a single A4 sheet, watermarking, and the handling of a wide range of

media. Eleven preset paper sizes are supplemented by a "custom" option ranging from 3 x 5in to 8.5 x 14in. Delivering ten pages of text in 54 seconds, with the first arriving in 14.3 seconds (16 seconds from sleep mode), this printer is fast. It can be connected directly to Ethernet 10Base-T/BNC and LocalTalk networks in the same way as a terminal, or the file server or PC through which it is linked. Being 25 percent faster than the LaserJet 5, with a 10,000-page toner cartridge and a 65,000ppm duty cycle, the 4000 TN is the ideal choice for offices.

Nik Rawlinson

### PCW Details

**Price** £1662.63 (£1,415 ex VAT)

**Contact** Hewlett Packard 0990 474747 [www.hp.com/uk/](http://www.hp.com/uk/)

**Good Points** Fast and feature-packed.

**Bad Points** Internet install slow.

**Conclusion** An excellent office workhorse.

★★★★★

## Hardware

# Canon BJC-7000

Just right for a rainy day: we held our printed results under the tap and the ink didn't smudge!

**T**his large printer, with oversized cartridges to match, has five print settings ranging from high-speed 300 x 300dpi to fine 1,200 x 600dpi. It holds two cartridges at a time: black, and either CMY or a six-colour photo cartridge. Its 130-page, 15-envelope sheet feeder is supplemented by a manual-feed slot with a straight paper path. It can print on everything from plain paper to envelopes, fabric sheets, T-shirt transfers and high-gloss paper.

The high-speed setting produced around 2.5 pages per minute from Word, but although the quality of the print was good, with smooth edges and clear lettering in all print sizes, the output was decidedly grey. Upgrading to high-quality 600 x 600dpi took a few seconds less per page and produced extremely high-quality black text.

At 3mins 43secs per page in one of the three "fine" settings, the output was disappointing. Grey lines appeared in the larger letters and the quality of the output as a whole was noticeably diminished.



The BJC-7000 took 53secs to produce a page from Excel, and presented us with very clear results. The tiny characters were clearly defined and easy to read but we found its handling of business graphics patchy. The bars in the CorelDraw test, which are meant to be smoothly graduated, were clearly stepped in both high-quality and fine settings on either photocopier or inkjet paper, although in its favour, the BJC-7000's manipulation of the reverse hairline was one of the best of any inkjet we have seen.

Using the photo cartridge and inkjet paper to print an A4 TIFF file took just 17mins and 57secs. The image had realistic colours and demonstrated clear differentiation between the tones of all colours in the spectrum.

Results from all cartridges are 100 percent water resistant, and even after submerging them in a bowl of water or placing them under a running tap we could not get the ink to run or smudge.

Nik Rawlinson

### PCW Details

**Price** TBA

**Contact** Canon 0121 680 8062  
[www.canon.co.uk](http://www.canon.co.uk)

**Good Points** Quick. High-quality text production. Water resistance.

**Bad Points** Patchy quality of business graphics.

**Conclusion** Versatile. Worth considering for home office use.

★★★★

# Tektronix Phaser 380

It's a big'un — a full-bleed A3 colour printer with good output and suitable for large office use.

**T**he Phaser 380's predecessor, the 350, was a revolutionary colour printer which used the unusual combination of solid ink and offset printing technology. The Phaser 380 is a full-bleed A3 colour printer — something special in the world of colour printers.

The 380 is big and weighs 100kg. Its size is determined by its printing technology. Unlike other colour printers, it uses wax-like colour "stix" which it melts and sprays onto a drum which deposits the whole image, a page at a time, onto paper. And because it's an A3 printer, the drum has to be so much larger.

Commissioning the printer is straightforward and having powered it up, it took about 20 minutes to warm up and deliver a stripy cleaning page. The printer has an energy-saving mode, but this is no more than a gesture as it takes so long to wake up that I can't see anybody using it. It comes with a high-density Centronics parallel port (although an adapter cable is provided), a SCSI port and connector for second paper feed, and there is provision for an ethernet print server card. There is an easy-to-use LCD control panel and four buttons but it's designed to be



configured remotely via your web browser. During testing, the 380's dithering produced a slightly grainy effect, particularly in photos. You could adjust the dithering patterns but the Windows driver made this an unnecessarily fussy business. But for business graphics and other colour work, the colours were fully saturated: solid areas were fully filled, gradients showed no banding, and thin lines in graphics and text were reasonably crisp and clean. And you won't need expensive paper either: it prints out quite happily on the lowest-grade copier stock.

Print speed was a little lower than claimed. It took 120 seconds for the first page of an A3 full-colour page to emerge and thereafter another A3 page was spat out every 40 seconds. A4 page speeds were faster: one every 24 seconds. For an A3 printer these speeds are fairly impressive and compare favourably with ordinary A4 colour lasers. Occasionally on long print jobs it would pause to melt some more ink, which slowed it down slightly.

Roger Gann

### PCW Details

**Price** From £8,806 (£7,495 ex VAT)

**Contact** Tektronix UK 01628 403613  
[www.tektronix.com/Color\\_Printers/](http://www.tektronix.com/Color_Printers/)

**Good Points** Great-looking A3 full-colour output at a decent lick.

**Bad Points** Still only 300dpi (300 x 600dpi with extra memory). Dithering can look grainy. Small, 250-sheet paper tray.

**Conclusion** Sounds expensive at £7,500 but not by A3 colour printer standards.

★★★★

## Hardware

# Xerox DocuPrint XJ4C

Xerox goes for the SME market — a fair price for a fair, rather large, colour inkjet printer.

**X**erox is getting into the “small to medium enterprise” inkjet market with the DocuPrint XJ4C. It is a rather large printer with a single print head holding four individually replaceable ink wells (CMYK). An on-screen graphic charts the amount of ink left in each well while four lights on top of the unit warns you when one has run dry. The print driver lets you carry out all maintenance on-screen.

Six media types, from plain paper to transparency, are supplemented by 13 pre-set sizes and a user-defined option. Installation was easy. In operation, the printer was very quiet.

At 54 seconds per page, draft text came out more dark grey than black with the character edges noticeably feathered. This bleeding was still evident, although less pronounced, after selecting normal quality (which takes a minute to produce one page) but still the text was not a

firm black, even on inkjet paper. In high-quality mode the feathering was minimal but certainly visible on the smaller characters, delivering a page of this still dull text in 2mins 16secs.

It takes 1min 47 secs to print a full page from

Excel, which makes the DocuPrint XJ4C slightly slower than many comparable printers.

Again, the quality of the output was fuzzy but the machine redeemed itself in its handling of business graphics. Although the

use of photocopy paper and selecting normal quality produced slight banding and flecks of white in the solid blocks of colour, this was much improved at high quality on inkjet paper. The banding

disappeared and the colour blocks were rich and firm. The stepping on the magenta and cyan gradated bars was so slight that it was barely noticeable, but an inverse hairline was not clear.

Photographic reproduction was disappointing. Leaving the driver set to Auto and using high-quality output on inkjet paper produced a rather extreme set of contrasts, but the full-page image arrived in 9mins 28secs. Changing the setting to Photo increased the print time to 10mins 42secs and, while it toned down the colours slightly, the finished product was still more Warhol than Botticelli.

Nik Rawlinson



### PCW Details

**Price** £198.58 (£169 ex VAT)

**Contact** Xerox 0800 454 197 [www.xerox.com](http://www.xerox.com)

**Good Points** Excellent price. Quiet.

**Bad Points** Disappointing text quality.

**Conclusion** Fair, but you could buy better.

★★★

# Video Blaster WebCam

Net video-conferencing, stills and video capture — all-in-one. No hardware installation needed.

**I**t wasn't long ago that video conferencing was the sole preserve of elite business users. Today though, thanks to the internet, this technology is available to anyone and so more internet videophone products are being released. The Video Blaster WebCam is one of them, but with a twist.

Unlike many of the current video-conferencing/web-phone packages out there, you don't need special hardware to get it to work. Other products, like Intel's Create and Share and VideoLogic's PCI Captivator, require you to install a video-capture card in your PC. Not so with the WebCam: just a working parallel port and an installed 16-bit sound card, preferably with a duplex option. Bundled with the WebCam is everything else you need to get started: microphone, software and manuals. All you have to provide is an internet connection. It will operate via modem or LAN.

Creative Labs is pitching this product as an all-in-one solution. It will capture stills at resolutions ranging from 128 x 96 to 176 x 144 pixels and full-motion video in resolutions from

200 x 152 to 640 x 480 pixels. The maximum video-capture speed is 15 frames per second, but if you're running on a 28.8Kbps modem you'll be lucky to achieve this frame rate.

The software bundle is impressive. It comes with Ulead's

MediaStudio 2.5, which is an excellent, easy-to-use video-capture and editing

program for the home. In addition, it has I-Spy to help web enthusiasts convert and update live pictures to their web site, and Howdy! to create

multimedia email postcards. There's also a webphone to help you make voice or video calls. To top it off, Creative Labs has thrown in HotMetal Light for web-page authoring.

The WebCam is handy for those into easy setup but don't expect perfect images and fluid motion from this kit. It all works, but a little less efficiently than if you had a dedicated video-capture card. The software, though, is great, especially for beginners keen to try PC-based video production, or web enthusiasts wanting to enhance their web pages.

Dylan Armbrust



### PCW Details

**Price** £149 (£126.80 ex VAT)

**Contact** Creative Labs 01734 344 322 [www.creativelabs.com](http://www.creativelabs.com)

**Good Points** Great software bundle. No hardware installation required.

**Bad Points** Video camera quality a bit below par.

**Conclusion** Good for those interested in multimedia web pages or home video-editing on the PC.

★★★

## ■ Hardware

# Creative Labs

## PC-DVD Encore Dxr2

DVD is probably the future format for home cinema. Here, we review an all-in-one PC DVD kit.

**R**esembling a conventional CD yet boasting 17Gb maximum capacity, DVD has most recently been described as the Digital Versatile Disc. Originally specified to store over two hours of high-quality MPEG-II digital video per side, DVD looks set to be the future format for home cinema.

The global MPEG-II digital video standard meant that titles bought abroad would play on any machine, but Hollywood, with its staggered movie release dates had other ideas. Its strict regional coding of titles by country meant players in the UK, say, would be able to play back only discs made for the UK. This messing around with the standard significantly delayed the domestic launch of DVD which, despite being ready for release two years ago, has only just become available in the US and Japan.

DVD is a fabulous format for PCs. Like CD-ROM before it, DVD-ROM promises even bigger encyclopaedias and games, and with the aid of an MPEG-II decoding card your PC could play back DVD movies. In a similar move to the first CD multimedia kits of years ago, the usual firms are beginning to offer complete PC DVD kits. Creative Labs' PC-DVD Encore Dxr2 is just that: a box containing an IDE DVD-ROM drive, PCI MPEG-II decoder card, all the cables and drivers you need, and three games remastered on DVD to include extended MPEG-II video clips. The drive plays normal CD-ROMs at up to 20-speed and DVD-ROMs at double-speed. Being a 2nd generation DVD drive, it will also play CD-R discs. You'll need at least a P100 with 16Mb.

Installation is fairly straightforward: connect the DVD ROM drive to a spare E-IDE port, preferably as the master device. If you've already got a CD ROM drive mastering your secondary IDE channel and want to keep the drive installed, Creative recommends making it the slave to the DVD master. Windows 95 should recognise the DVD drive and assign it a drive letter as easily as it does for a conventional CD-ROM drive. The MPEG-II card slips into a spare PCI slot, requires a free IRQ interrupt and happily installs itself using the supplied driver on floppy disk.

On the blanking plate are several connectors. To view DVD video on your monitor, you'll need to plug it into the Creative card and use the supplied cable to pass video through to your existing graphics card. Another plug supplies both composite and S-Video outputs to your TV to watch movies if desired, although the cable Creative supplies is only a couple of metres long. An RCA jack supplies the raw SPDIF digital audio



signal, be it linear PCM stereo or Dolby Digital AC-3 surround, to an optional decoder. Analogue audio is passed from the drives via the Creative card to your sound card, using internal cables.

A CD is supplied with Creative's DVD movie playback and navigation software. When installing for the first time, it asks you which of the six DVD movie regions you are in: Region 1 is North America, Region 2 is Europe, and so on. But what it really means is, which DVD region do you want to be in? If you select Region 1, then the system will happily playback North American titles but not the forthcoming Region 2 European titles. If you select Region 2, then you're sorted for the Euro discs, but not the US ones. You can only have one Region installed at a time and there are currently no European Region 2 titles available. But here's the rub: the software only allows you to change the Regional settings five times, after which you're stuck with the last setting.

A possible solution is to set up two identical Win95 Hardware profiles, with Region 1 installed on one and Region 2 on another. This remains an unproven trick until we receive Region 2 software, but this system certainly played back all our Region 1 titles. And pretty good it looked, too. The NTSC video of Region 1 movies played back on a compatible TV set looked very respectable (much better than VHS and similar to LaserDisc), particularly when using the S-Video connector.

The Dxr2 part of the product name refers to Creative's scaling, interpolation and flicker-elimination of MPEG-II video when played back on your computer's monitor. It certainly worked, but I preferred the image when running full screen at 640 x 480 pixels; at least most people could switch to full 24-bit colour at this resolution. Using the graphics card pass-through cable slightly reduced Windows desktop picture quality at very high resolutions. Sound was good, especially Dolby Digital soundtracks when replayed through an external AC-3 decoder.

The Encore bundle represents great value for anyone wanting a taste of DVD, or to upgrade an old CD ROM drive. But DVD software availability is limited to a handful of US Region 1 imports, so you may want to wait for a proper UK launch.

Gordon Laing

### PCW Details

**Price** £299 (£254.47 ex VAT)

**Contact** Creative Labs 01245 265265  
[www.cle.creaf.com/](http://www.cle.creaf.com/)

**Good Points** Cheap, complete DVD kit.

**Bad Points** Early days for DVD titles.

**Conclusion** Great value for early adopters or CD upgraders.

★★★★

## Hardware



# Agfa ePhoto 1280

# Casio QV700

Time for digital cameras: at least one of these snappy little models should click with you.

**T**wo new digital cameras have hit the shops, swelling the numbers of such cameras in the sub-£1,000 range.

Both are the top of the range for their respective manufacturers. The ePhoto 1280, with a top resolution of 1,280 x 1,024 pixels, marks a significant step for Agfa, one of the biggest film manufacturers which up to now has only marketed a basic digital camera (manufactured for them by Sanyo). Casio, meanwhile, has been busily adding new cameras to its range and the QV700 is its latest top-end model.

The Agfa ePhoto 1280 is no great looker, with its grey plastic shell and the large and ungainly swivel lens with the flash attached, but what it lacks in looks it makes up for in quality. It is one of only two sub-£1,000 digital cameras with a resolution of 1,280 x 960 pixels (the other being the Kodak DC-120). There are other resolutions available, too: 1,024 x 768 and 640 x 480, both with two levels of JPEG compression. If image quality and the ability to reproduce your pictures quite large are your prime concerns, the highest resolution gives the ePhoto an edge over the competition. In addition, the camera has a 3X continuous optical zoom, with the lens equivalent to a 38-114mm lens on a 35mm film camera.

At first look, the camera seems to have few options for settings: just a single dial with the choice of having the camera either in play or record mode, and switched off. There are also buttons to scroll through

automatic setting to take you back to the defaults, you need never worry about these things and as they are effectively hidden from you, there is no need to dabble unless you are interested.

A 4Mb CompactFlash card, on which to save your photos, is supplied as standard but at the highest resolution this only stores six shots. However, this increases to 60 if you only use the 640 x 480 pixel resolution with standard compression. It does not help that there is no viewfinder, only an LCD screen which is a notorious drain on power. An AC adapter is an optional extra and the camera is normally powered by four AA batteries. We were supplied with a battery recharging unit but it takes several hours to recharge the batteries so you will need more than one set to keep going when you are out and about.

The ePhoto comes complete with Agfa PhotoWise for downloading, Live Picture PhotoVista for pasting images together and LivePix SE for image manipulation.

By comparison the Casio QV700 does seem a little pedestrian. Casio has a large range of digital cameras and a large slice of the budget market. Almost all their cameras have the same basic design with an LCD panel on the back and a lens which swivels through 270°. The camera has a top resolution of 640 x 480 pixels and a lower resolution of 320 x 240 pixels if you only need small images.

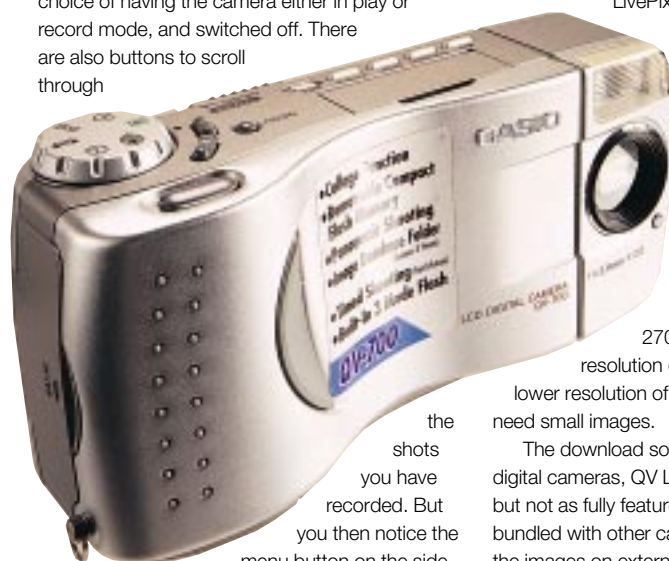
The download software is, as on all Casio's digital cameras, QV Link. It's easy enough to use but not as fully featured as some of the software bundled with other cameras. The QV700 stores the images on external CompactFlash memory; you get a 2Mb card as standard. This will hold 47 economy, 26 standard and 14 fine images. It is powered by four AA batteries and the external power cable is an optional extra.



The controls are reminiscent of Fuji cameras with a simple dial on top, with icons to select your options. You choose whether take photographs in continuous mode (several shots in quick succession) or in panoramic mode. Or you can take a picture of writing, for tilting your pictures, or you can date-stamp them. There is a self-timer on this dial, too.

There are some extra functions, like the TV output port, a self-timer, flash, macro mode and the ability to zoom in to part of an image on the LCD. Overall, though, there is little here that is new or innovative. Casio seems to think it is enough to turn out basically the same camera time and again. The company is looking a little behind the times compared to the cameras being produced by their competitors.

Adele Dyer



the shots you have recorded. But you then notice the menu button on the side and a bewildering array of options: everything from aperture settings and white balance, to macro modes and five other focus settings. However, because these options also have an

## PCW Details

**Price** £762.58 (£649 ex VAT)

**Contact** Agfa 0181 231 4906

[www.agfahome.com/epphoto/1280/](http://www.agfahome.com/epphoto/1280/)

**Good Points** Has everything you could want from a digital camera, and more.

**Bad Points** Styling.

**Conclusion** If this had been in our digital cameras group test (Jan '98 issue), it would have won.

★★★★★

**Price** £499.99 (£425.52 ex VAT)

**Contact** Casio 0181 450 9131

[www.casio.co.uk](http://www.casio.co.uk)

**Good Points** Versatile and idiot-proof.

**Bad Points** Unadventurous compared to others in its price range.

**Conclusion** Look around at the competition before buying.

★★★

## ■ Hardware

# Dazzle

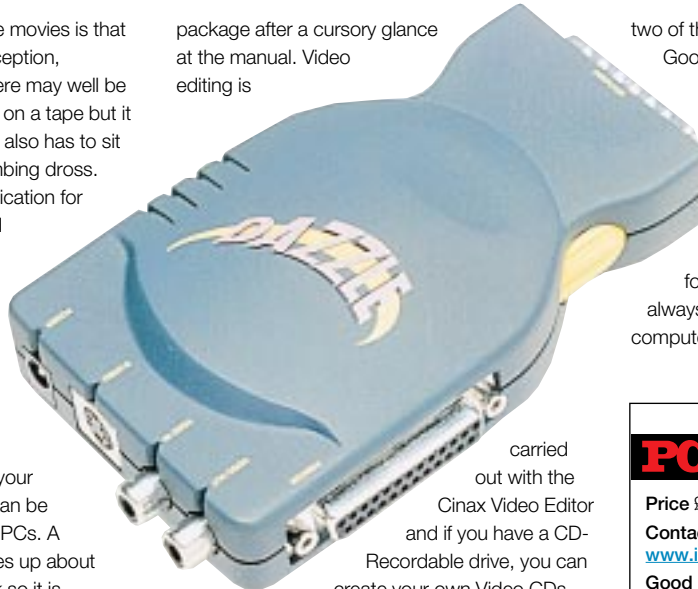
What a blinder! PC on... director's chair out... sleeves up... and edit your home videos.

**T**he trouble with home movies is that they are, without exception, frighteningly dull. There may well be ten minutes of solid gold footage on a tape but it will never be noticed if the viewer also has to sit through three hours of mind-numbing dross.

Video editing is a natural application for a PC but until now it has involved fitting an expensive internal add-in card. Dazzle is a real-time MPEG-1 encoding device which plugs into the parallel port on a PC. In layman's terms, it takes standard composite or S-Video signals, compresses them by a factor of around 200 and stores them on your hard disk. The resulting movies can be edited and played back on most PCs. A minute of compressed video takes up about 10Mb of space on your hard disk so it is important to have lots of spare room before you begin video editing.

The software interface for Dazzle, called Amigo, is unusual but well designed. It is fairly intuitive so it is easy to get going with the

package after a cursory glance at the manual. Video editing is



carried out with the Cinax Video Editor and if you have a CD-Recordable drive, you can create your own Video CDs with CeQuadrat WinOnCD 3.

In addition to videos, Dazzle can capture still images from a video source so you can effectively use your video camera as a digital camera. Playing about with photographs is great fun and

two of the best packages around, Kai's Power Goo and Adobe PhotoDeluxe 2, are included.

Dazzle is a well-specified package but there are a couple of drawbacks. The first is simply a limitation of MPEG-1 encoding: it is not up to VHS quality, unlike DVD which uses MPEG-2. The second drawback is that Dazzle cannot output compressed footage to a television, which means you'll always have to watch your videos on a computer screen.

Adam Evans

### PCW Details

**Price** £269 (£228.94 ex VAT)

**Contact** Imago Micro 01635 294300  
[www.imagomicro.co.uk](http://www.imagomicro.co.uk)

**Good Points** Simple to use. Good clean fun.

**Bad Points** It cannot record back to videotape. MPEG-1 quality is not as good as VHS.

**Conclusion** A great package if you are happy to watch your videos on your PC.

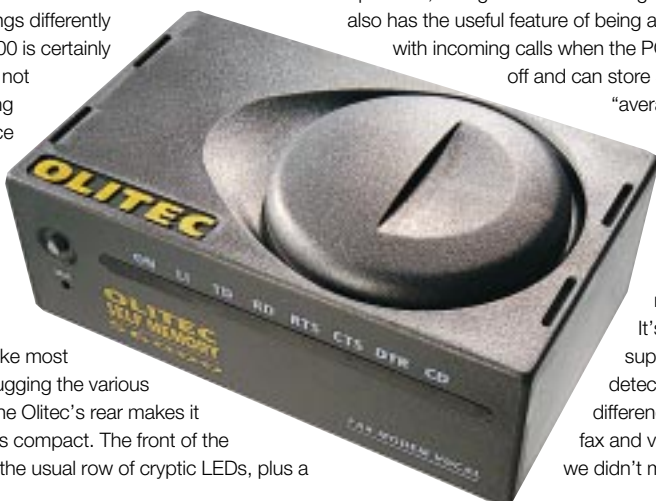
★★★★

# Olitec Self Memory 56000

A neat little K56Flex modem with extra features. It could tuck into almost any spare corner.

**W**hile US Robotics has been keeping x2 close to its chest, the Rockwell/Lucent contingent has been more open with its version of 56K technology, and K56Flex modems are available from all and sundry. The not-so-catchily-titled Self Memory 56000 Flash is from French company Olitec and the modem is now available in the UK.

The French are renowned for doing things differently and the 56000 is certainly different. It's not exactly oozing style but since it's the size of a disposable camera, it can at least be tucked away almost anywhere. Like most modems, plugging the various cables into the Olitec's rear makes it markedly less compact. The front of the modem has the usual row of cryptic LEDs, plus a



button to activate the built-in microphone. A speaker is hidden behind a rounded moulding on top. Speaker and microphone quality are both reasonable enough, although there are sockets at the back of the modem for connection to external speakers and the bundled desktop mic.

The Olifaxvoice software covers most requirements, including hands-free speakerphone operation, faxing and voice messaging. The Olitec also has the useful feature of being able to cope with incoming calls when the PC is switched off and can store 50 A4

"average text density" faxes or 20 minutes' worth of voice messages. It's also supposed to detect the difference between fax and voice calls but we didn't manage to

activate any of these features using the slightly confused pre-release manual. The finished version will hopefully make things clearer.

As a K56Flex modem, the Olitec Self Memory Flash acquires itself very respectably. Using the same suite of tests as in our group test last November, it gave an average download speed of 35.04Kbps with a compressed executable file and 104.24Kbps with an uncompressed text file (both with hardware compression enabled).

Julian Prokaza

### PCW Details

**Price** £168.03 (£143 ex VAT)

**Contact** NP Datacom 01787 476976  
[www.olitec.com/sm56english.html](http://www.olitec.com/sm56english.html)

**Good Points** Respectable 56K performance. Standalone operation.

**Bad Points** Clumsy back-end with all the cables connected.

**Conclusion** A neat little performer whose extra features put it a notch above the rest.

★★★★

## Hardware

# Tandberg SLR5

This or that? SLR or DAT? It's your choice, but here is a cheaper alternative to the DAT drive.

**T**raditionally, DAT (Digital Audio Tape) has always been a popular choice for backing-up PCs and entry-level network servers. A combination of a native 4Gb tape capacity and transfer rates of around 35-40Mbytes/min makes it ideal for this type of application. However, there are alternatives as Tandberg Data is keen to point out. The latest tape drive from the Norwegian-based company is the SLR5 which uses meaty 5.25in QIC (Quarter Inch Cartridge) tapes with which hardened UNIX users will be familiar. These offer the same 4Gb capacity as DAT DDS-2 tapes but, at £18 each, cost about a third more. This may seem expensive but when you see the superb build quality you'll understand why, and it's precisely this which causes so much argument about which is the better media.

DAT tapes are cheaper because they have far fewer moving parts and rely on the drive to provide tensioning and alignment, whereas QIC cartridges deal with all this internally. The upshot



is that QIC cartridges don't wear out so quickly so you spend less on

replacements. The SLR5 is available in internal and external versions and the latter comes with a SCSI cable included. Loading is carried out manually by flipping down the front panel, pushing the tape home and locking the panel shut. As the drive is aimed at network backup I tested it on NetWare and Windows NT Server platforms using Seagate's Backup Exec and Cheyenne's ARCserve software. Installation in all cases was simple, although it's probably safest to make sure ARCserve for NT is fully up to date with Service

Pack 3, available on Cheyenne's web site. Unfortunately, I found performance to be the biggest drawback for the SLR5 as it averaged 28.5Mb/min in all the backup tests; working out at around 25 percent slower than DAT drives.

Even so, the SLR5 makes a strong argument in its defence as it is some £200 less than a DAT drive. The cartridges last up to twice as long as DAT tapes, so operating costs will work out lower in the long run as well.

David Mitchell

### PCW Details

**Price** Internal £446.50 (£380 ex VAT); external £583.98 (£497 ex VAT)

**Contact** Tandberg Data 01582 769071  
[www.tdata.no](http://www.tdata.no)

**Good Points** Cheaper than DAT drives and better media longevity.

**Bad Points** Slower than DAT drives.

**Conclusion** If you're more concerned with tape life than backup speed, the SLR5 is a solid choice.

★★★

## Software

# Microsoft Works 4.5

Update to the alternative office software suite; great for home use and tops for templates, too.

**W**orks is an excellent alternative to office software suites, especially so for home, school and small office use. It provides a tightly integrated word processor, database and spreadsheet. This version adds internet capability with the inclusion of Internet Explorer 3.02. In addition, Works comes with lots of clipart and document templates to help you create all sorts of documents from a report to a poster. There is an easy-to-use interface and all the basic features of a word processor, database and so on, are provided. The more specialised tools are lacking, which makes Works easier to learn and use.

The enhancements to Works for Windows 95 in this version are minor. They include 100 new templates for creating documents associated with home, school, and social events and activities, and a new Clipart Gallery containing an impressive 7,000 professional-quality images (a massive increase from the previous 107!). Aside from the inclusion of Microsoft Internet Explorer and an updated Works to Word converter, this is essentially all that separates Works 4.5 from earlier releases, which makes this a less than



You can create an address book, too

overwhelming upgrade for existing users. For new users it is a different matter. The templates in particular not only automate the process of creating many common documents, they can also save you having to buy other software applications. For example, there is a template which produces a very acceptable address book and will save you the cost of investing in a stand-alone contacts manager. Another creates To-do lists. You can create a home inventory to list your possessions for insurance purposes and students

and teachers will value the template that helps you create well laid-out reports and theses.

Works 4.5 automates most common tasks with features like Easy Formats and ReportCreator. The clipart gallery is extensive and Works incorporates WordArt for creating effects with text. It is only available on a single CD-ROM.

Paul Begg

### PCW Details

**Price** £99.99 (£85.10 ex VAT)

**Contact** Microsoft 0870 6010100  
[www.microsoft.com](http://www.microsoft.com)

**System Requirements** Windows 95

**Good Points** Excellent integration. Templates makes it easy to create almost any sort of document.

**Bad Points** Not much of an upgrade for existing users.

**Conclusion** An excellent introduction to computing for beginners, but there is no reason to upgrade.

★★★★



## Software

# BT LineOne v2

A fresh online service intending to create a sense of community for new and existing websters.

**D**esigned to appeal mainly to a British mass-market audience, BT's LineOne goes head-to-head with the established players such as CompuServe, AOL and MSN who have adapted the American model to try and exploit the burgeoning UK online community. Unlike its competitors, LineOne does not try to integrate a regional flavour into a global online community, but aims to create its own community based on British culture: the *Sun*, football, students, Mystic Meg, and the *Funday Times* are all here. Some content is tailor made, mainly that provided by News International, but a large proportion of the sections link through to the web. Although these pages could be accessed through any service provider, LineOne offers extra value via aggregation and presentation.

The LineOne CD includes Microsoft's Internet Explorer and automatically configures your PC to connect to the LineOne homepage. The CD also includes a number of multiplayer games which can be used in the GameWave section of the site; this is a nice touch as it saves downloading the games.

The installation process was slick: we were on LineOne after only a few minutes. Once on the homepage, you are presented with a graphical menu of the main areas of LineOne, and the Springboard which is a frame that sits at the bottom of the screen. This enables quick access to personal settings, a search facility and a pop-up menu for direct access to each sub-section of the service. The only problem was the Microsoft browser. The bundled version was out of date and, with the latest version, much of the scripting did not work. We eventually managed to get the site to work with Netscape Navigator 4, but hopefully the service will conform to a more open set of standards as it evolves.

As for content, there is so much of it that we can hardly do it all justice in this review. The news section is the stronghold of News International, including *The Times*, *Sunday Times*, the *Sun* and the *News of the World*, as well as a weather page and Fox News. Sky Sports dominates the sports section, with an excellent real-time display of headlines, and the football section is superb. The money section covers investment, insurance, mortgages and pensions, with helpful comparative listings of credit-card and savings accounts, plus other interactive financial advice.

The education section gives access to the BT Home Campus, a distance learning facility, as well as the *Times Education Supplement* and the BBC's Learning Station. Lifestyle issues, including



**Left** The Homepage has been reorganised since version 1 to make it easier to navigate

**Below** There are many useful services, such as this personalised TV and radio guide

Each section follows a consistent design and non-LineOne content is flagged. An area in which LineOne excels is in the organisation of this content, and in the small



touches: the speed and ease of use of its popular gaming section, the inclusion of a live chat area, a forums section based on net news standards, and the comprehensive choice of local services like travel, weather, accommodation, TV listings and restaurant guides.

As an online service LineOne is in its infancy, and I'm sure it will evolve as more people join and offer feedback, but LineOne has already provided enough of a reason for people to sign up. Its vision of what an online service can be is more ambitious and appealing than its competitors. LineOne succeeds not only by grouping content together but also offers a truly localised service. Never mind the bugs, the messages stating "Sorry, this bit isn't connected yet", and the hotchpotch of technologies and interfaces. LineOne offers a great introduction for the newcomer, and the opportunity for experienced users, if they give it a chance and a bit of time, to find a place they can call their "Homepage".

Barry de la Rosa

health, food and fashion, are covered and this same section additionally provides links to the new student webzine, 4-D. The shopping area is an online mall covered by LineOne's own charter which guarantees a high standard of security, and includes a number of vendors offering computers, wine, coach and theatre tickets, books, flowers and music, with links to other online shopping areas.

The travel pages range from public transport information to holiday booking through British Airways and include an interactive weather page. Restaurants, music, TV and film listings are in the What's On section, and for those who want to socialise over the net there are online forums, a chat area and an online radio station. The fun section has areas for kids and an excellent gaming section where you can log in and kill fellow LineOne members — virtually, of course!

A comprehensive business section includes online directories of UK businesses, sections for management, marketing, finance, and IT news, and a starting-up guide. The knowledge section offers Discovery World and a science section, plus links to *National Geographic*, the History Channel and the Discovery Channel, and a trivia quiz section. Finally, the internet section offers advice for novice web surfers as well as links to good starting pages and directories.

## PCW Details

**Price** £14.95 (£12.72 ex VAT)/month, unlimited use; £9.95 (£8.47 ex VAT) basic, for five hours/month, then £1.50 (£1.28 ex VAT)/hour; £6.95 (£5.92 ex VAT)/month, content only.

**System Requirements** Windows 95/3.1/3.11

**Contact** BT [www.lineone.net](http://www.lineone.net)

**Good Points** Slick interface. Easy to set up. Excellent services. Almost a sense of community.

**Bad Points** Bundled browser. Some content missing, some not appropriate to UK audience. Service not fully evolved.

**Conclusion** A vision of the ideal online service, with flexible membership options, marred by inconsistent content and other growing pains.

★★★★

# Symantec Visual Café 2.0

Visual development will be less of a grind with JavaBeans — read our taster of this new café.

**N**ot content with being an also-ran to Microsoft and Borland as a supplier of C++ development tools, Symantec jumped early towards Java. First there was Café and then Visual Café, which added visual design tools to an IDE (integrated development environment) for Java. These products gained Symantec a strong market share, at least among those developers who use an IDE.

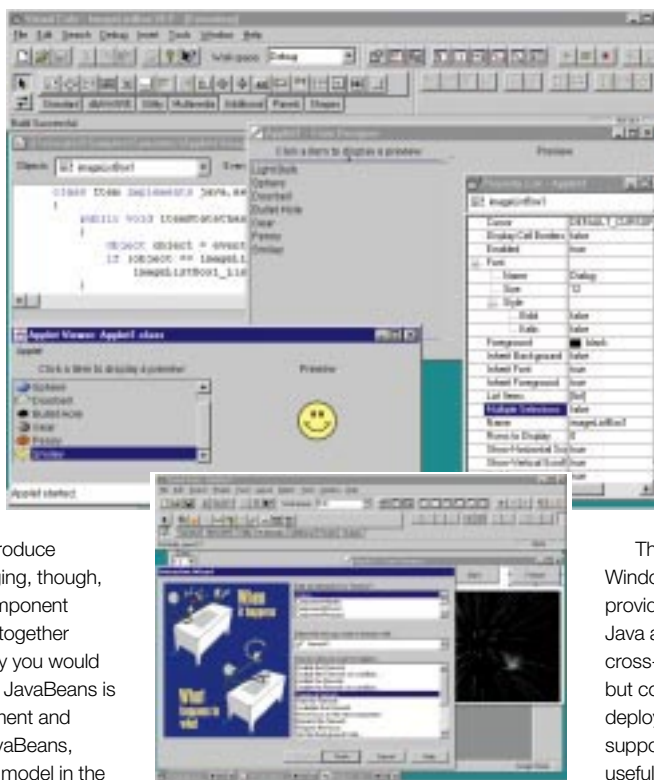
Many have stubbornly preferred to use Sun's JDK (Java Development Kit) along with their favourite text editor, partly to stay up to date with the latest version and partly because all Java tools introduce problems of their own. This is changing, though, with the advent of JavaBeans, a component model for Java which lets you snap together pieces of Java code in the same way you would use ActiveX controls in Visual Basic. JavaBeans is designed for use in a visual environment and Visual Café 2.0 makes full use of JavaBeans, along with the new, improved event model in the JDK 1.1, to provide a compelling visual development tool for Java.

Visual Café for Java is offered in three guises. The Web Development Edition is aimed at web authors and includes a basic version of the development environment along with Visual Page, an HTML editing tool. Netscape Communicator is also bundled.

The Professional Development Edition adds on-the-fly debugging, native code compilation for Windows 95 or NT, and additional components and wizards.

The Database Development Edition adds Symantec's dbAnywhere database server: not itself a database manager, but a middleware product which accepts Java database code and handles connection to ODBC or native data sources. Also bundled is the Sybase SQL Anywhere database manager and Netscape's FastTrack server, providing a comprehensive solution for setting up a data-enabled intranet.

The major new features of Visual Café for Java are first, JDK 1.1 support, including the all-important JavaBeans; and second, native code compilation for Windows. JDK 1.1 is a mixed blessing since browser support for it is patchy. Internet Explorer 4.0 supports most of it yet Symantec has focused on working with Netscape. As a result, Visual Café comes with a beta of Netscape Communicator; necessary,



**Left** The component palette, form designer, property list, code editor, and an applet running in the debugger

**Below** The Interaction Wizard lets you add functionality through point-and-click dialogs

code. It is a great time saver, although not quite the equal of the equivalent tool in PowerSoft's PowerJ.

Another strong feature is project templates. This starts a basic project for you, with choices including applets, applications, database forms, a skeleton JavaBean, a Windows application, and a Windows DLL.

The presence of a native code compiler for Windows runs against the Java spirit but should provide performance benefits for code-intensive Java applications. The idea is that you retain cross-platform portability at the source-code level but compile to native code for Windows deployment. A snag is that a large number of support DLLs are required at runtime. Although useful, this does not make Visual Café a good alternative to Delphi or Visual C++ for creating Windows-only applications.

Despite the rough edges, Visual Café 2.0 is a strong package that performs well. A bonus is the high quality of Visual Page, the bundled web page authoring tool. Serious Java developers should take a look, although competition from Borland, IBM and PowerSoft means that Visual Café is no longer an automatic choice.

**Tim Anderson**

since the current release version is incompatible with Visual Café's output.

The package mentions special Netscape debugging options but these are not yet available. You should also be cautious about the claimed support for JFC (Java Foundation Classes). This standard class library for Java has not yet been finished by Sun, so any work done with these is subject to change. All these are normal frustrations for web and Java developers, caused by rapidly changing standards, but nonetheless tiresome.

Visual Café's environment includes a form designer, component palette, project manager, debugging windows, a macro recorder and a number of wizards. Although in some respects it has been improved over version 1.0, the new interface has problems. There are some small irritations, like the high-level status bar which, when you drop down a menu, displays its help text behind it and out of sight. More seriously, the environment is too busy and it is easy to end up with a confusion of multiple overlapping windows. Borland's JBuilder and Microsoft's Visual J++ are both superior in this department.

Visual Café does have one ace up its sleeve though, and that is the Interaction Wizard. This lets you automatically link an event from one component to a method or property exposed by another. Visual Café automatically generates the

## PCW Details

**Price** Web development edition £92.83 (£79 ex VAT); professional development edition £292.58 (£249 ex VAT); database development edition £504.08 (£429 ex VAT)

**Contact** Symantec 0171 616 5600  
[www.symantec.com](http://www.symantec.com)

**System Requirements** Win95, NT 4.0 or Mac.

**Good Points** Strong JavaBeans support. Interaction wizard speeds development. Visual Page is an excellent bonus.

**Bad Points** Interface can be obstructive. Netscape bits are unfinished, as supplied. Not everyone wants to use dbAnywhere.

**Conclusion** A worthwhile upgrade offered in a range of generous bundles, but be prepared for some frustrations.

★★★★

## ■ Software

# Corel PrintHouse 3

This could be graphics on a grant — lots of print-based graphics resources for the impecunious.

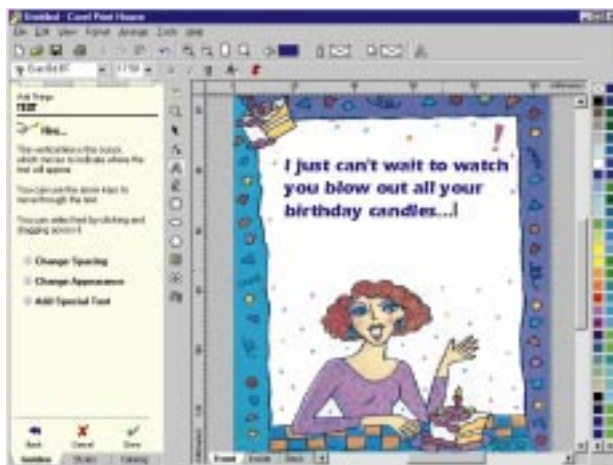
**C**orel's flagship graphic product, Draw, comes on three CDs, with over 1,000 fonts, 40,000 clipart files, a supporting cast of applications and costs around £395 (ex VAT). But Corel Print House comes on three CDs, with over 300 fonts, 25,000 clipart and photo files, vector-drawing and bitmap-editing applications — and all for less than a tenth of the price of Draw. There's Family and Friends, too, which is an address book and a calendar that somehow involves installing 8Mb of Borland database management software: something of an overkill, I felt, just for remembering Aunt Harriet's birthday. Then, there's a copy of Netscape Navigator, so in the unlikely event that you have a modem and an ISP but no web browser, you'll be able to access the Corel Print House home page.

PrintHouse is meant for greetings cards, letterheads, banners and other simple projects. It

certainly has no pretensions to DTP and is not suitable for producing newsletters or anything else that requires more than a few lines of text.

Start up, and you have the choice of either using one of 1,600 sample projects or starting from scratch. Taking the first course, you pass through various levels of sub-decision (cards, birthday, ageing, humorous) before seeing preview samples of the chosen genre. Having picked, you can then print out the project as it is, but more probably, you'll want to customise it.

It is here that the versatility of the tabbed Notebook panel to the left of the screen becomes apparent. It serves to show, via the Guided Activities tab, where you can add or change things, save or print the project. From the Catalog tab, it serves as a browser for the clipart, backgrounds and other resources, which include 1,000 inspirational messages with which to adorn your cards. The Styles tab works in conjunction with the drawing tools, in various roles including thumbnails of fill, outline and text styles ready to



Left Instant cards — guess the punchline



Below Photo fun with the page curl effect

drag and drop onto items. There are conventional option dialogs, too.

Starting from scratch is somewhat harder than you might expect, as Print House seems determined that you create a project, rather than just a picture. However, by pressing the Cancel button at the right time it is possible to start with a blank sheet, then use a conventional toolbar interface similar to, but far simpler than, CorelDraw. There are good drawing facilities here, with lots of colourful blended fills, text-along-paths, dropped shadows and "wrappers" which distort the outline of text or pictures. You can drag text and fill styles into the Style lists for re-use alongside the default versions. Another potentially useful feature is a mail-merger for, say, sending personalised invitations or Christmas cards.

On the bitmapping side, Photo House has an almost identical interface and an impressive range of wizard-driven special effects and filters, including lens flare, distortion, impressionist effect and the now-ubiquitous page curl. There is

support for Adobe-standard plug-ins, and the third-party AutoFX is included. This latter is like a separate program in itself, and can do some weird and wonderful things, but the rather unhelpful interface contrasts poorly with the ever-helpful Corel Notebook.

There's a reasonable set of painting and retouching tools, including an image-spray tool which lets you spatter the virtual canvas with a succession of different sunflowers, penguins or other sets of bitmaps. Finally, just for fun, there are libraries of hat, hair and face "objects" you can add to existing images.

We gave Print House a real-world test as this household needed a customised birthday card in a hurry. We had just one hour to install the software, create the card, include a scanned photo inside, print and sign it. Despite dithering for ages over the huge choice and having to fight the software to resize the card — you don't do Page Setup but go through a rather awkward Convert Project process — we just made it. The only bad point was printing. Having been through a long, paper-wasting, "hanny-knows-best" session to determine which way was up when printing on both sides of the paper, it still got it wrong and we had to try again using manual override.

Despite these small problems, Print House is fun, easy and packed with resources. Note, though, that as the name suggests it is purely for paper output so, unlike the rival Micrografix Draw (reviewed in *PCW*, Dec '97) there are no web publishing facilities.

Tim Nott

## PCW Details

**Price** £37.51 inc carriage (£24.92 ex VAT)

**Contact** Corel 0800 581028 [www.corel.com](http://www.corel.com)

**System Requirements** Windows 95

**Good Points** Easy. Fun. Loads of resources.

**Bad Points** A little limiting for the more ambitious. No web output.

**Conclusion** An excellent choice for short, paper-based output on a budget.

★★★★

## Software

# Superbase 3.2

In the lightweight corner, we've a 16-bit database which will run happily on a 386 with 4Mb.

**S**uperbase goes back a long way, to the days of 8-bit home computers and later the Atari ST and Commodore Amiga. Since then it has had a tangled history, as you can tell by tracking its version numbers. The last Atari version was Superbase 4.0. Then SPC took over the product and released a new Windows version called, remarkably, Superbase 2.0.

Unable to compete with heavyweights like Microsoft Access and Borland Paradox, SPC handed Superbase to Computer Concepts, which issued Superbase 95, still a 16-bit application despite the "95" tag.

Superbase made no headway with Computer Concepts either, so its UK-based developers set up their own company. The new version is still 16-bit, and the version number has retreated from 95 to 3.2. It is not a full version upgrade. The printed manuals still cover Superbase 95, with new features described in online documentation. A 32-bit version is, apparently, in preparation but the company says it is not expected, even in beta form, for another six to twelve months yet.

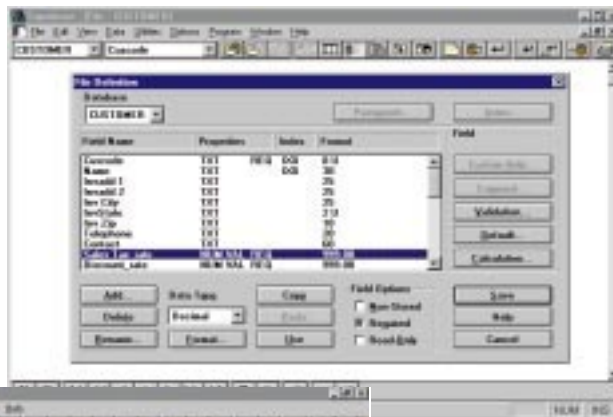
Superbase stores data in its own unique format, which has a range of features. You can define fields as unique, required, read-only, or calculated from other fields. Each can have a validation formula, enabling you to restrict its values to a precise range, or to check that its value matches that in another file. An unusual feature is called multiple responses. It lets you store several values in one field, assigning each value to a different level.

There are surprising omissions, though. One is that you cannot fully enforce referential integrity, to prevent related data files from getting out of step with one another. Another is that Superbase does not understand memo fields used by other systems to store large text documents or multimedia data. Superbase handles this kind of data via external fields which store only a filename. This means that images or sounds, for example, remain as separate files in their original format. Although there are some advantages to this approach, the down side is that you end up with lots of separate files on your hard disk.

Two other key Superbase components are the form designer and the programming language. Through the form designer you can compensate for the weaknesses of the underlying data format by setting up relational links and using features like detail blocks and cascading deletes to correctly handle related files. The form designer has a basic range of graphical and data-aware objects but unfortunately cannot use VBX or OCX controls. There is a way around this using

**Right Superbase data files have several advanced options but several striking omissions**

**Below The Superbase form designer is fine for basic forms but does not support VBX or OCX controls**



an accessory called SuperBoxes to hack into the Windows programming interface, but it is not easy. The SuperBasic language lets you create complete custom applications using a full-featured version of Basic and driving SuperBase through its object model.

There are editors for creating custom menus and toolbars. You can also control other applications such as Excel through OLE automation. To complete the picture, there is a visual query builder and a report designer.

New features in Superbase 3.2 include filters for over 250 file formats, enabling you to view a vast range of image and document types via external fields. And there is huge integer maths, with support for integers of up to 122,880 digits, with each digit exactly specified. This is particularly useful for encryption, and an RSA encryption library is supplied. Built-in crosstab queries is a strong feature for applications which need to analyse data.

An internet edition is available, at extra cost, which bundles a QuarterDeck web server with scripts and tools for publishing Superbase data on the web. Superbase is now MDI (Multiple Document Interface) which is a significant

usability benefit over previous versions.

For running a networked database on very low-end PCs, Superbase is ideal although not especially cheap. It also has attractions if you want to write a custom application to manage images in a variety of formats. Existing users will find this a worthwhile yet unspectacular upgrade. It is hard to see it as more

than a niche product though, especially since it is marketed primarily as a development tool where it cannot compete effectively with rival products from Microsoft and Borland.

**Tim Anderson**

## PCW Details

**Price** Superbase 3.2 £387.75 (£330 ex VAT); personal edition £58.69 (£49.95 ex VAT) no programming capability; network client licences available at extra cost.

**Contact** Superbase Developers 01223 365550 [www.superbase.com](http://www.superbase.com)

**System Requirements** Windows 3.1, 95 or NT (no long filename support).

**Good Points** A lightweight system which requires just a 4Mb 386. Supplied with a huge range of image and multimedia viewers. Crosstab queries for data analysis.

**Bad Points** Too difficult for end-users and too limited for developers. No easy way to use VBX or OCX controls. Still a 16-bit application.

**Conclusion** It would be great to see this British product succeed, but its main attraction will be as an upgrade for existing users.

★★★

## Software

# Communicate!

A comms tool which will handle voice fax and data, plus OCR, email, and contact management.

**C**ommunicate! aims to integrate functions usually found in separate programs. Unfortunately, the program itself is not that impressive and has a number of irritating defects and idiosyncrasies. Most of these centre around its fax and OCR engines, of which more later. It intercepts calls, decides whether they are voice, fax or data transmissions and routes them to an appropriate module. This is where most comms programs stop, but Communicate! goes on to provide email, OCR and contact management.

Sent and received email messages are stored in the outbound and inbound logs along with fax, voice and data files. Faxes are converted into editable text by Calera's OCR engine, which is invoked from a separate graphics editor which has an OCR option on its menu bar. The contact management feature is an extended address book with additional fields (95 in all) to store information like the date of last contact and a date for a scheduled call. Existing address books in dBase and .SDF formats can be imported into the contact manager, and it's during this process you realise that not all is what it seems.

On installation you're offered a 16-bit or 32-bit version of the program. We chose the 32-bit option, which is why we were surprised to see that the Import dialog box in the contact manager couldn't display long filenames. But didn't we use a long filename to record voicemail messages? A quick glance back at the voice recorder proves we did. In fact, the program is a mishmash of 16-bit and 32-bit code. The graphics editor and voice file modules support long filenames but the contact manager and inbound/outbound logs don't. A quick scan through the program files on the hard disk revealed a mixture of 16-bit and 32-bit libraries and executables. Even a file called OCR32.EXE turned out to be a 16-bit module. Weirdly, if you export a file from the contact manager or one of the logs you can give it a long filename, even though the directory scroll boxes cannot display them. If you OCR a fax and give it a long filename, the program truncates it to eight



## Send your faxes flying out from Windows applications

script by following your keystrokes. If Communicate! is not instructed to answer calls automatically, when you pick up the phone and hear a fax tone it is possible to transfer the call to Communicate! — many answering machines drop the line if you try this.

We had no problems receiving and storing faxes, or sending them from Windows apps via print-to-fax, but outbound faxes

characters. It doesn't ask for permission and truncates Presentation1.txt to Presenta.txt. When you later save Presentation2.txt, it truncates this to Presenta.txt and overwrites the first without notice.

The longer we used the program, the more inconsistencies we found. In the inbound and outbound logs, when you delete a file it's placed on a deleted list. You can view deleted files at any time and remove them permanently by using a purge option. Files scheduled for future transmission don't show up in the outbound log until they have been sent. Prior to this they're stored in a separate queue log, which is doubly inconvenient because its Remove option peremptorily deletes files from the hard disk rather than placing them in the outbound log.

Another annoying quirk is that if you delete a fax image but not its log entry, when you try to view the fax you get an error message that the file cannot be found. Unfortunately, when you click on OK the program closes or crashes. Less serious, but just as irritating, is that the F1 function key is not wired up to the help system.

The data and voice facilities are comprehensive and work well. We liked the conversation recorder, and the auto-learn feature in the terminal program which creates a login

created using the scan-to-fax option had about two inches cropped from their right-hand sides. This seems due to a bug in the .TIF converter for outbound faxes. Inbound faxes, which are stored in an internal format, were unaffected. A related problem with scan-to-fax was that Communicate! did not acknowledge the PC's existing TWAIN scanner until we had installed a second scanner which forced it to choose a TWAIN source.

The contact manager is wrongly named. It's just a souped-up address book with no diary or calendar, no time management, and with only rudimentary printing facilities such as a label generator, with no alignment or preview options.

Paul Wardley

## PCW Details

**Price** £116.33 (£99 ex VAT)

**Contact** Peripheral Corner 01420 549794  
[www.fracom.co.uk](http://www.fracom.co.uk)

**System Requirements** Windows 3.x, 95 or NT

**Good Points** Lots of features.

**Bad Points** Not all of them work.

**Conclusion** A versatile program, but not intuitive.

★★★

## Software

# First Aid 98



PC problems? Is it having a nervous breakdown? Here is do-it-yourself brain surgery for PCs.

It is a perversion that as hardware and software manufacturers strive to make computers easier to use, the number of things that can go wrong seems to increase. One of the biggest markets for utilities is problem prevention and problem fixing, and a premier package is First Aid, now at version 5.

The most noticeable change is the new graphical opening screen (shown, right) which represents a desktop containing your computer equipment. Simply click on the picture of whatever is causing you problems, or what you think is causing a problem, and First Aid will automatically run the appropriate diagnostic checks. The desktop is extremely easy to use, but even so, when you first run First Aid 98 a friendly chap pops up to host a video which shows you how to use the product.

Frankly, finding and fixing problems used to be a heart-thumping exercise. The primary improvements to First Aid are to make resolving problems about as heart-thumping as lazing at the seaside in a deck chair eating an ice-cream. There's even a small army of How To videos that show you how to install new software and



The most distinctive difference is the desktop: just click to run diagnostic tests

hardware and undertake simple maintenance, such as cleaning your keyboard.

This new version automatically fixes more problems than previously — it boasts the ability to automatically fix tens of thousands of them! — and if First Aid hits a problem it can't resolve, a new feature called ActiveHelp Support provides a direct email link to the manufacturer who, in theory at least, will help. Additionally, it will examine your internet setup to make sure that it is running smoothly.

First Aid does all the things now expected of such a program, like running a virus check, being able to return your computer to a configuration prior to problems resulting from system changes resulting from a hardware or software installation, and jumping in to prevent system crashes. It comes with loads of reference tools, too, such as address, phone and fax details for hardware and software suppliers, and a glossary of PC terms.

Paul Begg

## PCW Details

**Price** £34.95 (£29.75 ex VAT)

**Contact** Cybermedia 0800 973631

[www.cybermedia.com](http://www.cybermedia.com)

**System Requirements** Windows 95

**Good Points** Very easy to use.

**Bad Points** Resolving a problem manually still isn't easy, there being an option to delete files and links without really knowing their importance.

**Conclusion** A worthwhile investment. Every PC should have one.

★★★★★

# GuardDog Deluxe

This Rottweiler growls at web gremlins, eats cookies and chases chancers off your hard drive.

If you surf the web under the impression that as long as you keep away from dubious sites and don't download any files from unknown sources, your privacy and security are protected, then think again. During a web session, dozens of files are downloaded to your PC and it's Guard Dog's job to make sure they don't do any harm.

Guard Dog is a set of seven utilities, bound together by a common interface through which each can be turned on or off. If you choose to have Guard Dog load automatically at boot-up, it will automatically run a virus check and wait in the background until it's needed. However, as most of its work is carried out while connected to the web, you might choose to enable it only when logging on for an internet session.

Cookie Blocker prevents unauthorised sites from downloading information to your PC, which can be read by other sites and used to track your browsing habits. System Monitor keeps an eye on downloaded ActiveX and Java controls, which are supposed to provide extra browsing facilities but could be used to tamper with your PC. Guard



GuardDog protects you from the files you download during an internet session

Dog checks to see that they don't scan your hard drive for information or try to format it.

The internet access monitor warns you if programs other than your web browser try to connect to the internet — they could be trying to send data from your PC to a third party — and File Guardian protects your email files, and any others you specify, from prying software.

All these protective mechanisms worked when we deliberately set about triggering them,

but one that didn't is the MyInfo filter. This is meant to prevent a site from passing on information you've provided, to another site, but it only seems to work intermittently.

Another feature is a utility to clear the cache, history log and URL site list after a web session so another user of your PC can't see what you've been doing. It works, but emptying the cache could slow down future browsing sessions.

Paul Wardley

## PCW Details

**Price** £49.95 (£42.51 ex VAT)

**Contact** CyberMedia 0800 973631

[www.cybermedia.com](http://www.cybermedia.com)

**System Requirements** Windows 95

**Good Points** Easy to set up and use.

**Bad Points** Rather expensive if you've already got an anti-virus package and a properly configured web browser.

**Conclusion** If you're worried about privacy, or the net is a mystery to you, buy it.

★★★

# Star Trek Encyclopedia



No Star Trek stone is left unturned in this Interactive Edition — the level of detail is astonishing.

**D**id you know that Starfleet vessels are built the opposite way round to buildings, with the first floor at the top and lower levels assigned higher numbers? Did you realise that in building Voyager, the Federation's engineers at Earth Station McKinsey abandoned the traditional optical processors in favour of bio-neural circuitry, or that Robert April and not Christopher Pike was the Enterprise's first captain? If the answer to any of these questions is "no", and you count yourself among the ranks of Star Trek fans, then this four-CD collection is a must. With over 3,000 pictures and 400 video clips from every series and all eight films, this is the ultimate Star Trek resource, answering every one of those burning questions that have nagged you for years. How does a combadge know who needs to receive a message? They all contain a dermal sensor that means each can only be used by a single crew member (in case you were wondering). It also offers the facility to integrate your own research and swap articles with other users, building this already weighty volume into a work of reference second to none.

Complete episode guides from the Next Generation and Deep Space Nine series,



supplying you with a handful of helpful phrases you might like to use when dining with Bajorans who, it says, use the term "spoonface" when referring to Cardassians. The interface is identical to that used on the Enterprise and the ship's computer will infest your PC, which even adopts Trek-speak, asking you to "Please confirm episode module deactivation request" when you click on Quit.

Nik Rawlinson

although none of the Voyager or Kirk and Spock episodes, include everything you could possibly want to know, from the week in which an episode was first shown and the stardate in which it was set, to a run-down of the storyline. The level of detail is astounding, chronicling even what food was eaten, what it looked like, and in which episode that particular dish appeared, as well as

## PCW Details

Price £39.99

Contact Zablac Entertainment 01626 332233

System Requirements Windows 95

★★★★★

# Wallace and Gromit



Our plasticine friends brought to animated life on your desktop, with Wendolene and Feathers in tow.

**T**here was a time when Christmas meant Julie Andrews and Steve McQueen. These days it means two lumps of plasticine — Wallace and Gromit. And now, their Cracking Animator means you can enjoy them all year around. Divided into three sections offering a range of Windows customisation tools, this is essentially a screensaver creation package. The Expressionator is your chance to manipulate the characters' mouths and expressions to match phrases in much the same way as the Aardman Animation team produce their claymation films. The Scene-o-matic lets you produce your own screensavers. Ten backgrounds can be customised with almost 50 props ranging from Wendolene's stack of wool balls to Gromit's bowl, and any of the six main characters from the animations can be placed within the scene, walking among and around the props.

The final touch is to add sounds or words. Sean the Sheep can baa or eat, while his walking could be accompanied by a choice of only two tunes. Make Wallace dance and proclaim "Maybe this will impress Wendolene", to which she might rather illogically reply, "Thank you for coming so quickly".



catching Feathers, the evil penguin, in a small glass bottle.

The three main sections of the package are accessed by clicking the objects on a desk in Wallace and Gromit's study. Section menus are laid out on the pages of small spiral-bound notebooks and sound customisation is controlled with a small radio. Even the mouse pointer has changed to a wedge of cheese, and clicking a button is accompanied by a fun sound.

Nik Rawlinson

The Customatic is like a cut-down kids version of the Windows Control Panel, used to turn your animations into screensavers. The dozens of backgrounds, actions and sounds mean that your Windows desktop need never be boring again. Three ready-made screensavers double as games, with a choice of flinging jam at Wallace's toast, expertly piloting your plane to shoot your porridge gun at Preston's truck, or

## PCW Details

Price £19.99

Contact BBC Multimedia 01483 204450

[www.beeb.com](http://www.beeb.com)

System Requirements Windows 3.1, 3.11 or 95

★★★★★

# Rhodes on Rom & Roux Brothers Desserts

England v France! No, not on the sports field — in the kitchen. Celebrity chefs get creative on CD.

**G**ary Rhodes' speciality is the neglected, and in some quarters even despised, British cuisine and he demonstrated its delights in his various BBC TV series, *Rhodes Around Britain*. In 1996 he entered into partnership with catering giant Gardner Merchant and in January 1997 opened the "City Rhodes" restaurant in London. On this CD-ROM he presents hundreds of his recipes. You can search for just the recipe you want in one of several ways: by region (fancy Irish colcannon, or how about open leek tart with warm poached egg from Wales?); by your mood (something for a romantic evening or just a reviving and tasty meal when you're dog tired); or you can choose a dish by its name. There's a recipe of the day, and a feature called The Melting Pot which lets you specify what you have in your cupboard and Gary will suggest a recipe to suit. The recipes are in text, generally with a picture of the end result, but there's no video and no explanatory commentary, so really the main advantage over a cookery book is the



special searching features.

Roux Brothers Desserts is more traditional in design, in that there are video demonstrations and narration by the brothers as well as text recipes you can print out. Thus, rather more than Rhodes, this two-CD set combines elements of both book and video. Inspired by their mother's cooking and after years spent in the private kitchens of the extremely wealthy, in 1967 Michel and Albert Roux opened their first

restaurant, Le Gavroche. The success of their restaurant, as much as something of a reputation for being the bad boys of French cuisine because of their stance against the then very fashionable Nouvelle Cuisine, have made them famous as the masters of "real cuisine".

Here's your own private cookery lesson with the masters. "Savoury food should look good," says Michel Roux, "but patisserie should be beautiful, artistic and taste

**Left** Lots of desserts from the masters

**Below** Step-by-step instructions for making stunning desserts and a picture of what the finished result should look like



wonderful. As the last dish of the meal it should leave a lasting impression, like the firework display after the concert." Here are no less than forty firework displays, each demonstrated on video and with comment and narration by the brothers. You can watch them prepare a dessert, listen to their tips for guaranteed success, and read and print out a text recipe. Excellent stuff.

As good as these CDs are, and they are both good and warmly recommended, they cost about twice the price of a cookery book or video. And apart from the ability to search — more relevant to Rhodes on ROM than to the Roux Brothers — you don't derive any significant benefits. A £10 drop in price would bring these CDs into line with competing media.

Paul Begg



The many faces of Rhodes: Click on one of the Garys to select a recipe of the day (above), choose from an A to Z of recipes, or find a recipe using the ingredients you have to hand

**Right** Choose a tasty regional dish like colcannon from Ireland



## PCW Details

Rhodes on ROM

Price £29.99

Contact Anglia Multimedia 01273 821104  
[www.anglia.co.uk](http://www.anglia.co.uk)

★★★★

Roux Brothers — Desserts

Price £29.99

Contact Macmillan Interactive Publishing  
0171 881 8070 [www.macmillan.co.uk](http://www.macmillan.co.uk)

★★★★



## Software



# Discoveries

This really is a discovery. A quartet of reference CDs which will stimulate and enthrall all children.

**D**o you have a home PC with a multimedia encyclopaedia but would be hard pressed to name anything your children have learnt from it? Discoveries, a new world history based on the excellent Gallimard-Larousse historical encyclopaedia, could be a different story.

In place of long texts that leave children bored and none the wiser, Discoveries has interactive screens, magazine-style spreads and loads of pictures. Its use of music, to set the mood for subjects, is as good as any Michael Nyman film score.

Our young testers were sad when learning about life in a Yorkshire cotton mill in the late 18th century, fascinated by a clockmaker's shop in 1500 and impressed by Pasteur in his laboratory. All of them found things to print off and take to school to show their teachers.



The CD covers history from the Big Bang to the present day. A time tunnel links all the information. You travel along using the up and down keys on the keyboard, choosing subjects as you go. Each topic begins with an Eye Opener screen that works superbly in capturing a child's interest. Eye Openers are animated murals which open out beyond the screen. You rove up and down, left and right,

discovering animations and voiceovers as you go. Things move and lights come on as you pass over windows. Roofs lift off to reveal what's happening inside buildings.

You can search reference material on topics by word or subject. The presentation is inviting and the quality of archive material is as good as you would expect from Larousse. The company publishes Discoveries, a series of children's reference books that leave Ladybird in the shade.

The program comes on four CDs or one DVD disc. As well as internet links, it has its own web site for updating information. Educational adventure games and historic places to explore in virtual reality are planned.

Debbie Davies

## PCW Details

Price £59.99

Contact IBM World Books 0990 426426  
[www.ibm.com](http://www.ibm.com)

System Requirements Windows 95

★★★★★

# Blue Peter CD-ROM

And here's one they made earlier: a collection of past BBC TV programmes, with extras.

**T**he BBC has had plenty of success transferring its programme formats to CD. How well does Blue Peter stand up to a computer makeover?

This CD-ROM is essentially a searchable archive of past programmes. You can search by date or subject, and topics covered include animals, travel, sport, science, music, personalities, cooking, gardening and history. The CD also contains a secret diary where you can enter your private thoughts. The archive material

is presented as a calendar with an entry for each day of the year, as well as an amazing fact. These are not always amazing, though: "Did you know that on this day in 1960... Gary Lineker was born?" is fairly typical of the standard.

Our testers found the Blue Peter CD most interesting as an information resource and used it as they would a multimedia encyclopaedia. It may not be comprehensive, but using the subject material and presentation style of the TV series has its advantages. Compared with the erudite

texts of multimedia reference programs, children found it accessible. It also had a good chance of covering relevant topics. Interviews with Alan Shearer, music from Boyzone and how to make string jewellery were favourites with our testers. The CD includes activities and games. There are 12 things to make and 12 recipes to try.

Visually the CD is disappointing, especially compared with BBC titles like

Animals of Farthing Wood, or Noddy. When you explore a topic, there is a dull, homemade style to its presentation. Most information is based on programme scripts. There are some video clips from the series but reminded our testers of their own scrapbooks. The expectation generated by multimedia is for something more exciting.

The secret diary includes a password. You can enter up to five different passwords so that brothers and sisters can keep their own diary safe on the same program. But you wonder how accessible a computer is for making diary entries last thing at night? This CD is probably best suited to Blue Peter die-hards who sport the badge and have all the annuals, yet still want something new.

Debbie Davies

## PCW Details

Price £24.99

Contact BBC Multimedia 0181 576 2000  
[www.beeb.com](http://www.beeb.com)

System Requirements Windows 95

★★★



## Software

# Boggle

Another game makes it onto disc. If playing in English is too easy, then try another language.

**N**ot all games survive transfer to the computer. Lego, for instance, takes on quite a different personality when you move it from the real world of 3D construction onto a computer screen. Boggle, which Hasbro has transferred onto CD, is essentially the same as the physical game and thrives in its new format.

You play traditional Boggle, using dice. The challenge is to shake the lettered dice on a tray and make as many words as you can by using consecutive letters only.

On the CD-ROM, Hasbro has developed five versions of the game. Each can be played at original and at master levels, as well as against the clock. If you want an opponent you can play with friends,

against the computer, or find someone to play with over the internet.

The new game versions use 3D blocks and moving dice. Playing with a cube of dice gives you more words to find, or you can play with dice streaming towards you at varying speeds. There is also a Scrabble version where you move dice

onto a board. Having five game versions gives good play value but the real advantage lies in playing against the computer.

In our first game, we managed 11 words against the computer's 136. In our next game, the computer seemed not to do so well, finding only 36; but that was from an impossible mix of Xs, Zs and almost no vowels. We managed to score one point!

As well as a list of words, you can click on words for a definition. The dictionary is multi-language so, in addition to games English, you could also play in German, Spanish or French. Boggle would amuse children aged five years or more and indeed anyone who likes crosswords.

Debbie Davies



## PCW Details

Price £19.99

Contact Hasbro Interactive 0181 569 1234  
[www.hasbro.co.uk](http://www.hasbro.co.uk)

System Requirements Windows 95

★★★★

# Peter Rabbit



Mr McGregor lives on in CD format. Follow the classic stories, play the games, learn words.

**I**t is a good many years since I have read a Beatrix Potter book (in fact, far more than I would like to admit) but they are books you never forget. In this CD, the Adventures of Peter Rabbit and Benjamin Bunny, Potter's words and some of her drawings and poems have been used, but mostly the illustrations and animations have been recreated in a style which is close to her originals. There is

not the level of detail which made the original pictures so good, but such detail would have been a nightmare to recreate in animated form.

Some of Beatrix Potter's books have already been made into cartoons, but here the text is meant to form the main focus of the child's attention so the animation is relatively limited. The story is broken down into little bits of text with an animated illustration on the same page, much like

the books. The text is highlighted as it is read and when the reading is finished, the difficult words remain highlighted, so if your child does not understand when the sparrow "implores Peter to exert himself" when he gets stuck in a gooseberry bush, he or she can look up "implore" and "exert" in the dictionary, thus helping them to build their vocabulary.

Each illustration has certain hotspots where things happen when you click: birds fly out of trees, squirrels leap from trees,

and butterflies fly off bushes. If you want to explore the scenes further you can leave the story and wander around in places like Peter's wood or Mr McGregor's garden and toolshed. If you click on objects here, you see words highlighted and they will be spoken if you click again. There are a few games hidden away here, such as catching the onions which Peter drops in his haste to find a way out of Mr McGregor's garden, or matching the small animals hiding under plant pots.

From the parent's point of view there are a few built-in extras which can point your child in the right direction. You can choose either American or British English, stop them using the printer unsupervised and not let them quit the program without permission.

Adele Dyer



## PCW Details

Price £19.99

Contact Euopress 01625 859333  
[www.euopress.co.uk](http://www.euopress.co.uk)

System Requirements Windows 3.1 or 95, Mac

★★★★★

# Visual C++ v4.0

Get programming with this: it's a great bargain for students and teachers but a 17in screen is a must.

One day I found I had a computer on which Doom would run but my favourite programming environment wouldn't. Okay, that's a slight exaggeration, as it *would* work but the programs it churned out didn't. So I played Doom for a couple of months and got very bored. When it comes to playing games you can't beat a serious programming session.

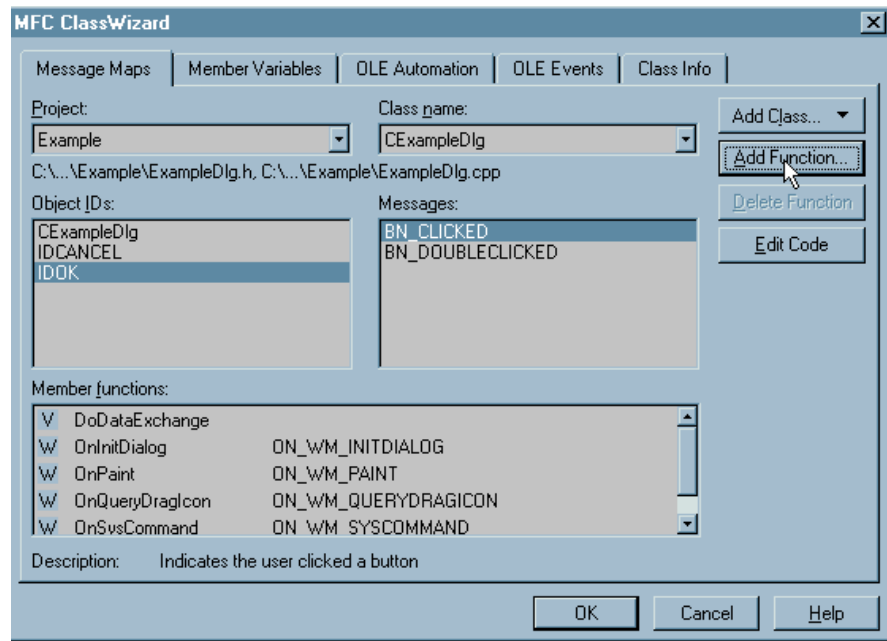
I then discovered that Microsoft was doing a good thing for students and teachers: selling software at a reasonable price. Consequently, I was able to afford a copy of Visual C++ Professional Edition v4.0.

The Microsoft Developer Studio, the heart of the Visual C++ package, is a joy to use. Everything is done via this interface. My only problem with the Developer Studio is that, with its customisable toolbars and docking windows, it can sometimes get a bit cluttered. A 17in monitor would be nice but I find a hotkey to toggle full-screen mode is a workable alternative.

Thanks to the way I purchased VC++, I have no manuals. However, all the manuals are included on the CD-ROM and are fully searchable from within the IDE. Lots of tools are built in, too. While all these tools aim to make programmers nicer people to live with, I can do without most of them. Only AppWizard and the ClassWizard could be considered life enhancing.

The AppWizard does all the initial project creation legwork for you. Answer a few simple questions and it will create the framework for an MDI database app with a floating toolbar and OLE support (or a simple dialog-based app) or even the beginnings of a DLL. You even have the option of extending the AppWizard but as yet I've discovered no real need to do so.

The ClassWizard, on the other hand, deals



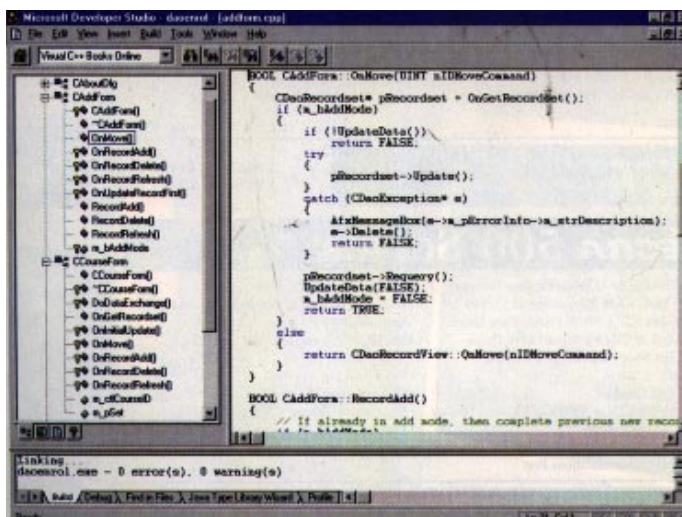
with ongoing program creation. It is particularly useful when using the resource editor. Creating a new dialog box takes about two seconds. Thanks to the ClassWizard, creating the derived class that sits behind the dialog also takes about two seconds. All the necessary nuts and bolts of your class are created auto-magically. The ClassWizard also handles dialog box controls. It will add a member variable to a dialog's class, either as a value variable through which you can exchange data with a control, or as a control variable, letting you access the control directly.

The real power of the ClassWizard is its ability to deal with message maps. Each and every object in a dialog box, including the dialog box

the February 1996 and March 1997 issues of PCW. The most notable complaint in these articles was that Visual C++ wasn't visual enough (for some reason, Visual Basic is held to be the ultimate in visual programming). Having tried it out, I found that you either do it the Visual Basic way or not at all. With Visual C++ you can do it the VC++ way, or you do it any way you please. The C language (and by extension C++) was designed to be a high-level language with low-level functionality. Visual C++ most definitely meets this goal, and it would lose something if more visual elements were added.

In my opinion, VC++ v4.2 is the version to have. The latest version of Visual C++, version 5, is not as fast. Unfortunately I have only got v4.0... anyone got a copy of v4.2 they don't want?

Peter McGarvey



itself, generates messages. As an efficient (lazy) programmer, I don't want to deal directly with these unless I really have to. Thankfully, all I have to remember is what is supposed to happen when a message is generated, then write the code. The ClassWizard takes care of all the tedium.

Two reviews of this most excellent product appeared in

## PCW Details

**Price** Visual C++ 5.0 Pro Upgrade £250 (£212.76 ex VAT); Pro Edition £369 (£314.04 ex VAT); Enterprise CD £819 (£697.02 ex VAT); Enterprise Upgrade £469 (£399.15 ex VAT)

**Contact** Microsoft 0345 002000  
[www.microsoft.com](http://www.microsoft.com)

**Good Points** Flexibility. Great interface.

**Bad Points** Not great if you don't have a 17in monitor.

**Conclusion** Couldn't live without it. Reasonably priced if you're a student or a teacher, otherwise horribly expensive.

★★★★

## Hardware

## Kodak DC20

Many digital cameras have hit the shops during 1997. Does one of the first on the market still stand up?

**T**he DC20 was one of the first and definitely one of the cheapest digital cameras available when it was launched, which was just over a year ago. Being a self-confessed gadget freak I had no alternative but to buy one immediately, and although the price has fallen since, I do not regret it.

The tiny silver DC20 can store eight pictures with 493 x 373 pixels, or 16 pictures of 320 x 240 pixels. Resolutions are good enough to look great on-screen, but there is no way you could use it for professional purposes.

Once captured, the pictures can be downloaded to any Windows or Mac system via the supplied serial lead, and the camera's memory erased.



For me, the big plus is convenience. There's no contest when the alternative to snapping a digital pic is to buy a roll of 35mm film, take 24 pictures, get them processed and then scan the photographs to get them into a digital format. By contrast, pictures taken with the DC20 can be transferred to the PC within five minutes. This is perfect for use with web pages and email, and

there are other uses, too. If someone asks you if you think their front door would look nice painted yellow, it's a minor task to show them, as long as you're familiar with something like Photoshop. It's even

better to be able to hand them a printout, and the DC20 makes a good friend to a good-quality colour inkjet printer.

It isn't perfect of course: there's no flash, which means good lighting is a must. The non-expandable memory is too small. Its eight-picture capacity is not enough to merit taking the camera on holiday, and the fixed focus lens and the lack of a self-timer limit creativity. However, the DC20 is excellent fun, especially as it comes in a bundle with Kai's Power Goo software.

John Kennedy

## PCW Details

**Price** £140 (£119 ex VAT)

**Contact** Kodak 0800 281487 [www.kodak.com](http://www.kodak.com)

**Good Points** Tiny, fun, easy to use. Convenient. Excellent software bundle.

**Bad Points** Limited memory. Fixed lens, and an image resolution too low for serious use.

**Conclusion** Great introduction to digital photography.

★★★★

## Texas Instruments TI-92 6 MONTH TEST

A powerful calculator is great for student and mathematician alike. But does the TI-92 match up?

**H**yped by its makers as having "the power of a computer lab with the independence of a calculator", the TI-92 replaces the TI-85 as Texas Instruments' most powerful calculator.

One thing that's tough to get used to is the size of this machine. It is slightly larger than a VHS videocassette but considerably heavier. Perhaps something with a flip screen, à la Psion, would have been better?

It has a Qwerty keyboard with reasonable-size keys and a large, 240 x 128 pixel screen. Among its many functions, those which caught my eye were symbolic manipulation (although this is not a new innovation), handsome 3D graphing, a text editor, and interactive geometry. And there is "Pretty Print" which shows results as you would write them, recursively definable sequences, and the possibility of multiple folders (directories). All these functions are easy to use, the manual is

helpful and the TI-92's interface is friendly. But some of this counts against it. All the graphics can make the 10MHz Motorola 68000 processor seem quite slow and I miss the TI-85's spontaneity. It has only 70Kb of usable RAM which isn't nearly enough.

TI also left out some of the TI-85's most useful features. If you want to perform base or measurement conversions, differential equations or certain matrix operations, then you'll

either to have to squeeze a program into RAM and put up with that processor, or use a TI-85.

The market for the TI-92 may already be shrinking as examination boards have banned its use in exams. Universities are not too enthusiastic about graphic calculators either, especially ones as powerful as this. As with the TI-85, you can link the TI-92 to a PC or a Mac: a group of determined programmers used this to write Fargo, their own OS/shell for the TI-92, which facilitates the execution of assembly language programs.

Richard Guy



## PCW Details

**Price** £200 (£170 ex VAT)

**Contact** Texas Instruments 0990 402400 [www.ticalc.org](http://www.ticalc.org)

**Good Points** Symbolic manipulation.

**Bad Points** Price, size, memory. Underpowered.

**Conclusion** With a bit more power, this could be a great graphics calculator.

★★★

# WordPerfect for DOS v5.0

This program has nearly made it into double figures. Can you see wrinkles or has it still got youthful energy?

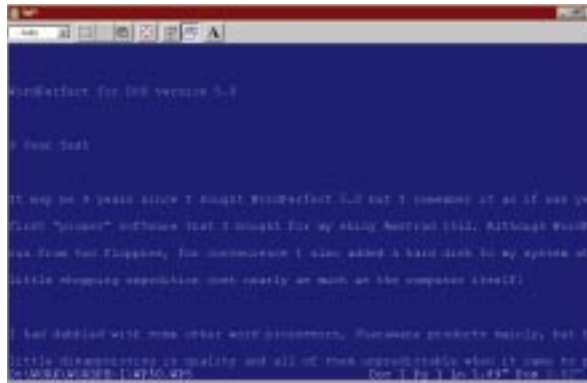
It may be nine years since I bought WordPerfect 5.0 but I remember it as if it were yesterday. It was the first proper software that I bought for my shiny new Amstrad 1512. Although WordPerfect would load and run from two floppies, for convenience I also added a hard disk to my system at the same time: that shopping trip cost nearly as much as the computer itself!

I had dabbled with other word processors, shareware products mainly, but found most of them rather disappointing in quality and all of them unpredictable when it came to putting words where I wanted them on the page.

I first saw WordPerfect demonstrated at an exhibition. I described to the young lady on the stand the problems I'd been having with columns, and watched as her fingers flashed through a handful of key presses. Then, from the printer, came a page of text in neatly printed columns. I was impressed, and a few days later I went shopping.

Starting the program at home for the first time I was faced with the clean blue screen that all long-time users of WordPerfect know well. At first, trying to find the appropriate combination of keys to create my own columns (or anything else) did not come easily, and I began to wonder whether I'd been a bit rash in my purchase.

The computer which sits on my desk today would give the long-departed Amstrad a terminal inferiority complex, but among all the point-and-click applications you'll still find WordPerfect 5.0 on my hard disk. There's no question that the learning curve was steep and sometimes frustrating but, once learnt, the key-press



combinations which are needed to do just about anything become second nature. When compared with today's quasi-DTP and WYSIWYG applications, WordPerfect may look a bit limited, but most of what the current crop of Windows word processors do can be achieved with WordPerfect. It may not be easy but it can be done! All the formatting functions are easily applied to blocks of text and, most importantly, the embedded formatting codes can be viewed and edited in a separate screen panel. Born of necessity because of the lack of a WYSIWYG display, this facility remains invaluable. Never do you have to puzzle over what caused that one line in the middle to be bold and centred.

But that, perhaps, is to ignore the strengths of WordPerfect. It is a word processor in the truest sense. The clean blue screen, which at first seemed a little unfriendly, lets you focus on the words. There's never an excuse to adjust the left margin midway through typing your document just to make it look better.

Don't misunderstand me — I'm not a Luddite desperately clinging on to my old DOS programs.

I'm an avid user of the latest generation of WPs, but if you need to get large amounts of text into a document, especially if you don't need any fancy formatting, WordPerfect 5.0 will do it with ease. On today's machines it is fast: paging through a 100-page document takes about four seconds; functions like Find and Replace, and Go To, are equally fast. If there is one major drawback it is that the choice of font tends to be limited to those resident in the printer. That said, there is a printer driver creation program which allows you to match the word processor to even the most eccentric printer.

Of course, one of the reasons for buying a mainstream product is that you can reasonably expect good technical support to be available and the current owner of WordPerfect, Corel, still appears to provide some support for this version through its online Knowledge Base.

In the end, I guess it's simply a case of horses for courses, but there are still a lot of courses where WordPerfect will give you a good run for your money.

Gary Beaton

## PCW Details

**Price** Product discontinued.

**Contact** Corel 01703 814142  
[www.corel.com](http://www.corel.com)

**Good Points** Fast, even on a "classic" machine.

**Bad Points** Takes a while to learn.

**Conclusion** Still a capable and versatile word processor.

★★★



# Budget scanners

A scanner can help you see words and pictures in a whole new way. Lynley Oram puts eight in the frame.

**W**ith the help of devices like scanners, you can do a lot of things on your PC that would once have been beyond the realms of possibility and limited bank balances. In this amazing world of technological miracles, you can scan in a page of text and edit it as though you'd typed in the words yourself. Or you can scan a photo image onto your PC and do whatever you like to it — turn your brother into an alien, or place yourself next to your celebrity "mates".

We've rounded up eight scanners, four of which cost less than £200 ex VAT, and four of which are priced under £100 ex VAT. At these mad prices, users aren't asking themselves whether they need a scanner. They're more likely to be saying: "Why not buy one?"

These budget scanners all connect to your PC via the parallel port. This is a major plus if like a lot of users, you find the prospect of opening up your PC and installing a SCSI card a scary prospect. Now that installation is a piece of cake, the question is, how easy are these scanners to use?

After all, even a hundred quid is a lot of money to spend on a chunk of plastic and circuitry that you can't figure out how to operate. All the scanners reviewed here claim ease of use, but do they deliver?

In this update we test how easy they are to use and how quickly you can get the hang of them. To find out our results, and the answers to other scanning questions, read on: you won't be disappointed.

## Scanners Contents

- 113 Aries Scan-It Pro 4830P
- 113 Microtek Phantom 4800
- 113 Mustek ScanExpress 1200P
- 113 Plustek Optic Pro 9630P
- 115 Primax MediaStorm Colorado Direct
- 115 Umax Astra 610P
- 115 Visioneer PaperPort 3000
- 115 Visioneer PaperPort 6000
  
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## Ratings

- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended

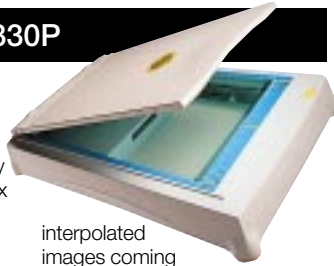
## Aries Scan-It Pro 4830P

The Aries Scan-It Pro 4830P obviously came from the same stable as the Optic Pro 9630P from Plustek. They are both tiny machines, measuring 275 x 80 x 415mm. They both use the same moulded plastic casing, drivers, and Action Manager software for one-touch scanning. The cheery, yellow Aries badge gives this scanner a friendly look.

The idea of just pushing a button to start is heavenly to a user who isn't interested in swotting for a technical degree just to operate a scanner. However, we found Action Manager difficult and confusing to use. It lacked the intuitive feel that other one-touch scanners have, and the process takes far too long to learn. The manual wasn't much help either; if anything, it just added to the confusion.

The Aries Scan-It isn't as highly specified as the Optic Pro, but it is cheaper. It offers an optical resolution of 300dpi which can be interpolated up to 4,800dpi.

Line-art scans were disappointing, with even



interpolated images coming out jagged and unappealing.

No scanner in this round-up managed to detect more than twenty shades of grey, so the Scan-It Pro did well to pick out eighteen. We were more pleased with the raw colour scan, which produced some rich, even, colour tones. The histogram had the perfect amount of fall-off at the extremes, with no evidence of clipping, which is something any decent scanner will avoid.

### PCW Details

**Street Price** £92.33 (£78.56 ex VAT)

**Contact** Watford Electronics 01582 745555; web site under construction

**Good Points** Colour scans. Size. Price.

**Bad Points** Line-art scans.

**Conclusion** At this price, a few jagged edges on the line-art scan hardly seem worth complaining about.

★★★

## Microtek Phantom 4800

Personal Computer World  
Highly Commended



Microtek's Phantom 4800 is accompanied by a very good manual. It uses screenshots well, and includes some excellent diagrams. On the downside, this was the only scanner that asked us to enter the BIOS and change the parallel port setting. The manual does fall down here, providing only cursory instructions which won't be a lot of help to an inexperienced user.

The Phantom was one of the speediest scanners in the group, whipping through the colour preview in only 12 seconds. A colour scan took a little longer, at 21 seconds, but an A4 line-art scan was completed in a speedy 14 seconds. Interpolation smoothed out the rough edges on the line-art image.

The raw colour scan produced some rich colour tones, and the Phantom clearly picked out twenty shades of grey. It also produced a good histogram, with no evidence of clipping. This is a good thing, as clipping is a sign that the scanner may be enhancing the apparent contrast of the

image, at the cost of highlight, shadow detail and overall image quality.

Microtek deserves brownie points for being the only company in this round-up to offer an automatic document feeder for its scanner as an optional extra. This little add-on is an absolute must if you are planning on doing a lot of OCR work. However, it won't be available to buy until the first quarter of 1998.

### PCW Details

**Street Price** £146.88 (£126.71 ex VAT)

**Contact** Midwich Thame 01379 649200  
[www.microtek.com](http://www.microtek.com)

**Good Points** Manual. Speed and quality of scans.

**Bad Points** Having to enter the BIOS.

**Conclusion** Great value for money.

★★★★

## Mustek ScanExpress 1200P

The ScanExpress 1200P is the latest entry-level scanner to be offered by Mustek, and has the easiest-to-use TWAIN driver in this group. However, if you find the prospect of any TWAIN driver daunting, don't despair: Mustek has simplified the whole process, with something called Cover Sensor.

Each time the scanner's lid is lifted, it activates the Wizard Dialog Box. From here, scanning is a matter of clicking on an icon, with separate icons available for scanning, copy/fax, email and OCR. The icons all have a picture of their function, making scanning more intuitive and less scary.

A colour preview took a brief 24 seconds; however, a colour scan took a slow 43 seconds. The line-art scan took 23 seconds. Colour-wise, the ScanExpress produced the most vibrant and rich colours in the group. Unfortunately, the histogram revealed clipping at the lightest end of the spectrum.

Bizarrely, the line-art images came out looking chopped, almost like the pixels had been hacked at by a mad chef.



Swapping to colour or greyscale mode produced a normal image, but we were unable to determine where the problem lay — it could be a one-off, to do with the software. Neither were we able to test whether a line-art image would improve with interpolation, as the TWAIN driver allows users to select only pre-set resolution levels, the highest line-art resolution being 600dpi.

### PCW Details

**Street Price** £163.33 (£139 ex VAT)

**Contact** Evesham Micros 01386 765500  
[www.mustek-europe.com](http://www.mustek-europe.com)

**Good Points** Cover Sensor. Vibrant colours.

**Bad Points** Line-art scans. Restricted resolution settings.

**Conclusion** Easy to use, but there are better and cheaper scanners.

★★

## Plustek Optic Pro 9630P

Plustek's Optic Pro 9630P is almost identical in appearance to the Aries Scan-It Pro 4830, except for the badge on the lid. It has a higher spec than its sibling however, offering an optical scanning resolution of 600dpi which can be interpolated up to 9,600dpi. Also, Plustek bundles its scanner with the Micrografx PhotoMagic 1.0 image-retouching software. The Plustek and Aries units are the trimmest flatbeds in the group, measuring only 275 x 80 x 415mm.

Naturally, we have some of the same gripes here that we have with the Scan-It Pro, namely with the Action Manager software. This package does offer a variety of faxing, copying and scanning functions, but it is rather hard to get the hang of it. Once you do manage to figure it out, it's a nifty piece of software, as it links the scanner to as many applications as you might have on your computer.

While we found the difference between scans produced by both machines to be minimal, the Optic Pro did



manage to produce ever-so-slightly better images than the Scan-It Pro. Only the raw colour scans were alike. Colours were rich and evenly toned, with no clipping in the histogram, and eighteen shades of grey were detected.

Performance-wise, the Optic Pro managed a colour preview in 29 seconds, a colour scan in 20 seconds and an A4 line-art scan in 28 seconds.

### PCW Details

**Street Price** RRP £149 (£132.44 ex VAT)

**Contact** Plustek 0171 813 3139  
[www.plustek.com](http://www.plustek.com)

**Good Points** Size. Software package. Colour scans.

**Bad Points** Line-art scans.

**Conclusion** Not a bad scanner.

★★★

Personal Computer World  
**Editor's Choice**

## Primax MediaStorm Colorado Direct

The MediaStorm Colorado Direct is a 30-bit device pitched firmly at the small office/home office user, with heavy emphasis on its ability to act as a fax and photocopier. This is just as well, as it produced some of the least appealing scans in this group.

On the plus side, Primax has made some vast improvements since we last saw one of its scanners. Its manuals are now clear and easy to read, and they make sense.

But the biggest area of improvement is with the TWAIN driver, which is now much easier to use. There are also a few advanced features that even scanning novices should be able to figure out without having to wade through a manual.

While interpolation greatly smoothed out the line-art image, it slightly overdid the job in places, giving the graphic a few extra bumps. However, it was the raw colour scan that really showed the Colorado in a bad light. There was a lot of noise in the mid-range grey, making a solid grey block look dirty and speckled. Not



surprisingly, the histogram revealed some extremely nasty clipping at the dark end of the spectrum. Only thirteen shades of grey were picked out.

Speed-wise, this was one of the slowest scanners in the group, with a colour preview taking 33 seconds and a colour scan taking 38 seconds. An A4 line-art scan took 45 seconds.

### PCW Details

**Price** RRP £99 (£88 ex VAT)  
**Contact** Primax 01235 546020  
[www.primax.nl](http://www.primax.nl)  
**Good Points** TWAIN drive. Price. Software bundle.  
**Bad Points** Raw colour scan.  
**Conclusion** OK for beginners, but scans may disappoint.  
★★

## Umax Astra 610P

Out of the really big players in the flatbed scanning arena, Umax is the only one currently offering a parallel port interface scanner for less than £100. We had high expectations of the Astra 610P, especially because of its strong pedigree: Umax has received PCW awards two years running for its budget scanners.

The Astra 610P comes with a nice selection of bundled software. For OCR purposes there's Presto! Page Manager, and for image editing, a copy of Adobe PhotoDeluxe. Getting the scanner installed is easy. On the other hand, getting your first scans out of the machine isn't quite as straightforward.

The manual isn't as detailed as some other scanning guides in the group, and it assumes that users have a reasonable level of proficiency when it comes to operating their PC.

For those who prefer their scanners to act more like photocopiers, the Astra has a scanning button. This hardly makes your life easier, as it has to be switched off via the



scanner's software whenever you want to use the printer. With all that bother, it's hardly worth using.

The Astra 610P makes up for it all by producing some excellent scans. Colours were lovely, with no evidence of clipping in the histogram and twenty shades of grey clearly picked out. It turned in a colour preview in 37 seconds, a colour scan in 24 seconds, and an A4 line-art scan in 15 seconds.

### PCW Details

**Street Price** £98.70 (£84 ex VAT)  
**Contact** IMC 01344 871329  
[www.imcnet.com](http://www.imcnet.com)  
**Good Points** Great scans. Software package. Price.  
**Bad Points** Ease of use.  
**Conclusion** Great value for money.  
★★★★

## Visioneer PaperPort 3000

Better known for its document scanners, Visioneer recently launched two colour flatbed scanners, both priced under £200. Identical in looks, the PaperPort 3000 is the cheaper of the two and carries an RRP of £116.33. However, that price could well drop when the product hits the shelves, as street prices are generally cheaper than those recommended by the manufacturer.

The best thing about opting for a Visioneer is that it comes with the excellent Visioneer PaperPort software. We like icon-based bits of software, mostly because a pictorial representation of the function you want to perform is always much easier to work with. Here, all the applications present on your PC are represented as icons. Once you've performed a scan, it is saved in Visioneer PaperPort as a thumbnail. Scans can be imported into applications the civilised way, by clicking and dragging the thumbnail over an icon and letting go.

However, colours in the raw



colour scan looked washed out, and the histogram revealed clipping at the lighter end of the spectrum. It did manage to detect a fairly respectable nineteen shades of grey, though. The PaperPort 3000 didn't let the side down when it came to speed, turning out a colour preview in 28 seconds, a colour scan in 18 seconds and an A4 line-art scan in 19 seconds.

### PCW Details

**Price** RRP £116.33 (£99 ex VAT)  
**Contact** Visioneer 0800 973245  
[www.visioneer.com](http://www.visioneer.com)  
**Good Points** Software. Ease of use.  
**Bad Points** Colour scans.  
**Conclusion** Will suit beginners.  
★★★

## Visioneer PaperPort 6000

The PaperPort 6000 is not only the more expensive of Visioneer's two new flatbed scanners, it also carries the heaviest price tag in this group. It still comes in at under £200. The 6000 has a higher spec than its stablemate, offering an optical resolution of 600dpi.

It's the appearance of Visioneer's flatbeds that really make them stand out from the crowd. Unlike the other scanners here, the lid on both of these machines is hinged on the long side rather than at the short end. This is a neat idea, as it means the scanner can be pushed lengthways, to the back of your desk, and still be used comfortably. Measuring 300 x 95 x 410mm, the 6000 will take up slightly less space than an open copy of PCW.

Using the interpolated maximum of 2,400dpi made a huge difference to the line-art scan. Colours produced in the raw colour scan weren't as vibrant as we'd have liked, but they did improve with a little tweaking of the gamma and brightness levels. According to

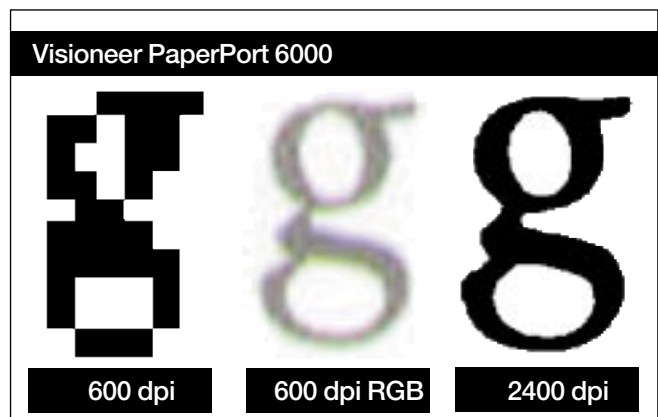
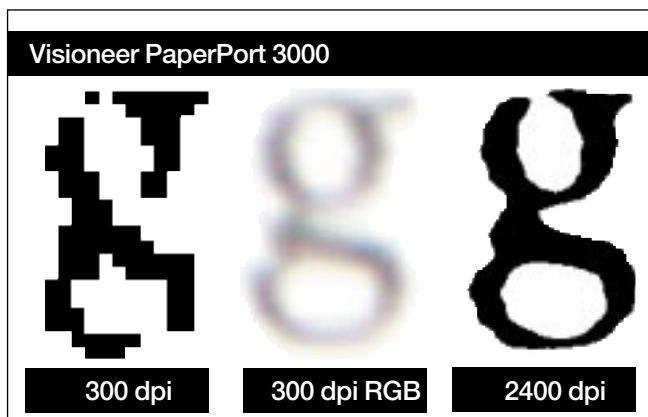
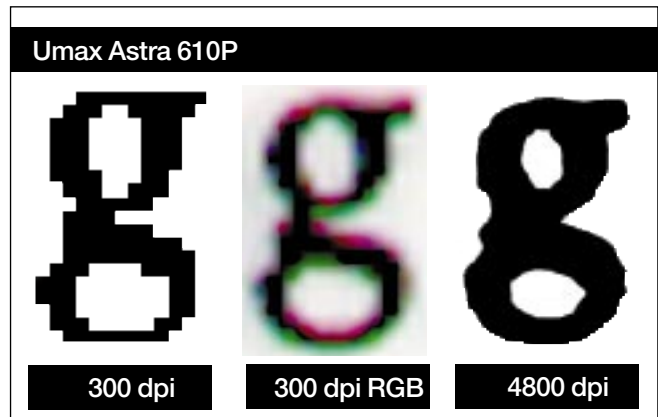
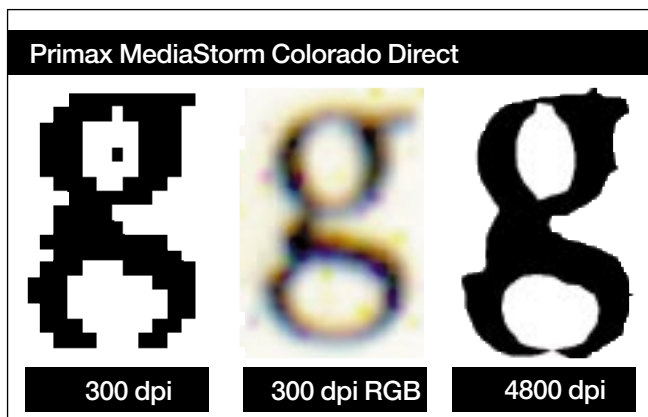
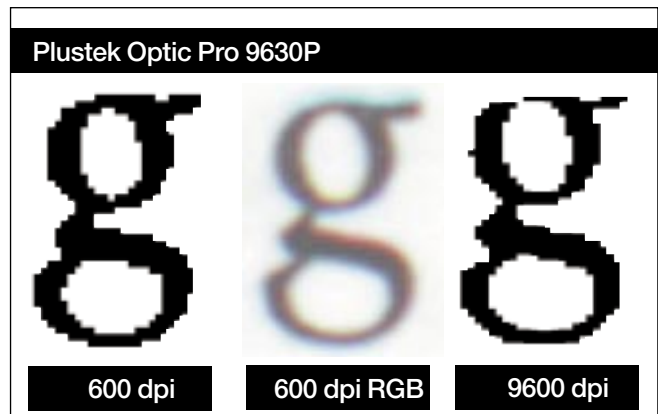
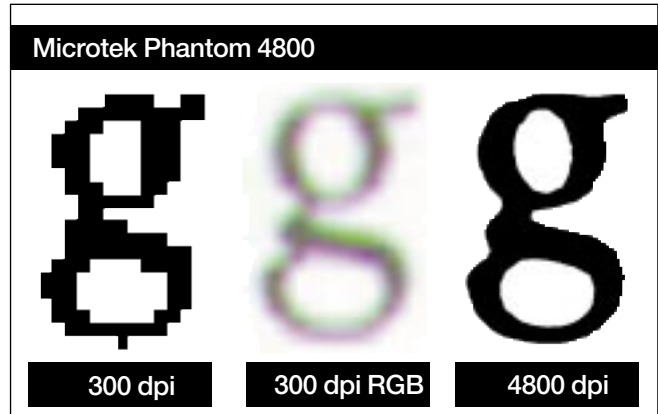
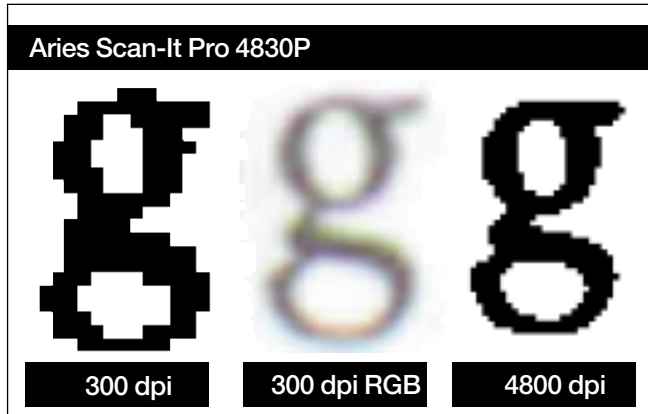


the histogram, all the extremes were covered, with no clipping, and twenty shades of grey were detected. An A4 line-art scan took only 20 seconds and a colour scan took 38 seconds. However, a colour preview took a lengthy 34 seconds. Installation is easy, and the 6000 comes with the excellent Visioneer PaperPort software, as well as Photo Enhancer and Xerox TextBridge.

### PCW Details

**Price** RRP £198.58 (£169 ex VAT)  
**Contact** Visioneer 0800 973245  
[www.visioneer.com](http://www.visioneer.com)  
**Good Points** Software. Looks. Ease of use.  
**Bad Points** Speed. Price.  
**Conclusion** A worthy contender.  
★★★





The true resolution of a scanner is its optical resolution, usually measuring 300 or 600 dpi. The scanner firmware or software can also interpolate or “make up” in-between values to effectively increase the resolution. This can only smooth edges, not invent detail that was never captured. We scanned the same tiny character on each model three times and printed them side by side above. Optical resolution in B&W **left**, then in RGB colour **middle**, followed by highest interpolated resolution in B&W **right**. Notice the huge difference in quality, and the often meaningless figures quoted by manufacturers. Fringes in the colour result indicate a lack of convergence that would reduce the quality of detailed colour scans.

Editor's Choice



**W**e're not about to pronounce the death of the SCSI-based scanner. In a head-to-head comparison, the cheapest SCSI machine in our last group test [August '97] outperformed all the scanners in this update. Bear in mind, though, that that particular scanner carried a price tag of £199 (inc VAT), which is the same as the most expensive scanner in this round-up. Also, the best of these parallel scanners all produced scans that were good enough for use on web sites, Christmas cards, newsletters and any sort of OCR work.

OCR stands for Optical Character Recognition, and it does exactly what it says. That is, the software will recognise scanned text as individual letters and drop the whole lot into a word-processing application, allowing you to edit or change the document.

Speed-wise, the fastest of these machines will allow you to preview and scan an image in less than a minute. This is an illusionary figure though, as it fails to take into account all the other time-consuming activities associated with scanning: sticking pointy ears and moustaches on those pictures from the office Christmas party, for example, will take time.

The scanners in this group all had optical resolutions of either 300dpi or 600dpi — optical resolution simply refers to what the scanner sees. The other figure quoted by manufacturers is the

interpolated resolution, which can be as high as 9,600dpi.

Interpolation takes the dots the scanner actually sees, and then, using software, calculates where the dots in-between would most likely fall. This should smooth out the edges on an image, particularly on a line-art image. But no matter what figure is quoted by the manufacturer, a scanner's interpolated resolution is only as good as the software that provides the interpolation, and this varies hugely from manufacturer to manufacturer.

Choosing a winner was difficult. Although there were easier scanners to install, a **Highly Commended** goes to **Microtek's Phantom 4800**. It produced some great scans, and scored highly in the ease of use department. The **Umax Astra 610P** [pictured, above] only just beat it to first place, and receives our **Editor's Choice** because of the great value for money it offers. ■

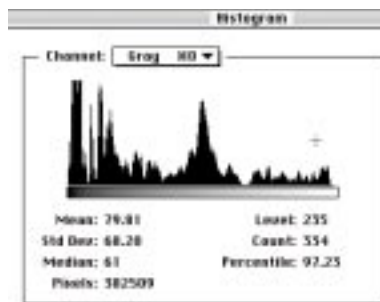


How we did the tests

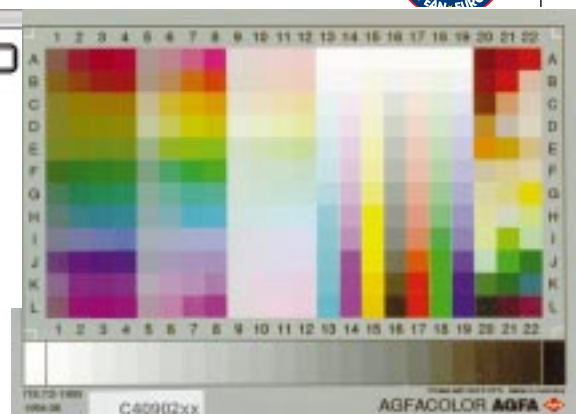


**A**ll the scanners in this round-up were connected to a 166MHz PC with 32Mb of RAM, via the computer's parallel port. We scanned an A5 colour print and an Agfa IT-8 test target at 100dpi. While it is possible to tweak a scanner's settings for the best results, this can be difficult and time consuming, so we have based our conclusions on the raw scans most users will be making. If the TWAIN driver offered a single-click auto-exposure or auto-adjustment feature, we used it, but otherwise we tested the scanner's out-of-the-box performance.

TWAIN is not an acronym; it is, in fact, a standard. The TWAIN driver is the software interface which drives your scanner, delivering an image into the currently active application. For example, Windows 95 has a little piece of software called Imaging. To open this, go to the Start menu, select Programs, Accessories, Imaging. In the File menu, you'll first select your scanner, then choose Scan New to open the TWAIN driver. TWAIN drivers vary between manufacturers but normally include a preview or pre-scan button, and a scan button, as well as controls for adjusting brightness, contrast and resolution.








The IT-8 target and histogram of the coloured portion, above. Note the fall to zero at both far ends, indicating a wide range with no clipping



Using Adobe PhotoShop's histogram facility we analysed the colour and greyscale portions of the IT-8 target. The histograms reveal a scanner's tonal range and any undesirable clipping in the shadow or highlight regions, while revealing any problematic gaps. Resolving power was tested by scanning a tiny six-point letter "g" at the highest optical and highest interpolated resolution offered by each unit (see page 116). Enlarging these and placing them side by side shows clearly that one 300dpi or 600dpi scanner is not the same as another. These letter g's were scanned as line-art images and for good measure we scanned the same letter g at its optical resolution, in colour mode. We also timed how long it took for each flatbed to make an A4 colour preview, scan an A4 photo at 100dpi, and scan an A4 page in mono at 150dpi. ■

Table of Features				
				
				
Manufacturer	Aries	Microtek	Mustek	Plustek
Model name	Scan-It Pro 4830P	Phantom 4800	ScanExpress 1200P	Optic Pro 9630P
Street price (inc VAT)	£92.83	£146.88	£163.33	£149
Street price (ex VAT)	£79	£125	£139	£132.44
Telephone	01582 745555	01379 649200	01386 765500	0171 831 3139
URL	Under construction	<a href="http://www.microtek.com">www.microtek.com</a>	<a href="http://www.mustek-europe.com">www.mustek-europe.com</a>	<a href="http://www.plustek.com">www.plustek.com</a>
Supplier	Watford Electronics	Midwich Theme	Evesham Micros	Plustek
Optical resolution (dpi)	300	300	600	600
Interpolated resolution (dpi)	4800	4800	9600	9600
Colour depth	30-bit	24-bit	24-bit	30-bit
Max scanning area (mm)	297 x 216	297 x 216	297 x 216	297 x 216
Retouching software	Image In Colour 3.6	PhotoImpact	Picture Publisher	PhotoMagic 1.0
OCR software	Recognita Standard 3.2	iPhotoExpress	TextBridge Classic	Recognita OCR
ADF option	<input type="radio"/>	avail early 98	<input type="radio"/>	<input type="radio"/>
Transparency option	<input type="radio"/>	avail early 98	<input type="radio"/>	<input type="radio"/>
Dimensions (wxhxd mm)	275x80x415	290x70x445	298x100x470	275x80x415

Table of Features				
				
				
Manufacturer	Primax	Umax	Visioneer	Visioneer
Model name	Colorado Direct	Astra 610P	PaperPort 3000	PaperPort 6000
Street price (inc VAT)	RRP £99	£98.70	RRP £116.33	RRP £198.58
Street price (ex VAT)	RRP £88	£84	RRP £99	RRP £169
Telephone	01235 546020	01344 871329	0800 973245	0800 973245
URL	<a href="http://www.primax.nl">www.primax.nl</a>	<a href="http://www.imcnet.com">www.imcnet.com</a>	<a href="http://www.visioneer.com">www.visioneer.com</a>	<a href="http://www.visioneer.com">www.visioneer.com</a>
Supplier	Primax	IMC	Visioneer	Visioneer
Optical resolution (dpi)	300	300	300	600
Interpolated resolution (dpi)	4800	4800	2400	2400
Colour depth	30-bit	30-bit	30-bit	30-bit
Max scanning area (mm)	297 x 216	297 x 216	297 x 216	297 x 216
Retouching software	MGI Photosuite SE	Presto!Page Manager	Photo Enhancer	Photo Enhancer
OCR software	ReadIris OCR	Adobe PhotoDeluxe	Xerox TextBridge	Xerox TextBridge
ADF option	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transparency option	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dimensions (wxhxd mm)	285x80x440	295x100x420	300x95x410	300x95x410

● Yes ○ No



# Popular science



**Don't be put off — scientific software can be employed in many non-scientific areas and you don't have to be a scientist to use it. Eric Adler reviews a selection of software which could be useful to a wide range of laymen in many areas.**

**S**cientists use software to take the drudgery out of calculations and, in many cases, to perform those which would otherwise be impossible. They use software to monitor, process and visualise data streams and to analyse and extract information from their data. Software can be used to model systems, to determine what is possible and what is impossible.

Mathematicians use software to investigate not only numbers but also forms and structures within abstract mathematics. These visualisations have developed into new mathematical art forms. Astronomers use software to analyse data arriving from the furthest reaches of the universe in the hopes that we may gain an insight into it all.

People in many spheres, from research pharmacologists to car production-line supervisors, use scientific software to analyse and determine courses of action. Non-scientists can also use the software: punters use neural nets packages to beat the bookies, city traders use mathematical software based on probabilistic models to gain an edge on the market.

Much scientific software is highly specialised, like the dedicated packages used to control laboratory instrumentation. Nevertheless, some packages, particularly those used in university training, have gained in popularity and are to be found on the corporate office workstation and sometimes even on the home and small office PC.

Here, we're looking at the broader picture of scientific software, taking ease of use and general friendliness into consideration, rather than just concentrate on the richest feature lists. A program which is so complicated that time is wasted trying to learn how to use it, is really less sophisticated than software which is easier to use.

We have divided our scientific software reviews into four broad categories: pure mathematics, applied maths, statistics and technical data presentation. There are obviously going to be packages which fall into several categories, so we have tried to focus on application areas rather than package descriptions.

### Scientific software Contents

- 124** Mathematics packages
- 126** Applied maths packages
- 128** Technical data analysis
- 130** Statistics software
- 132** **Editor's Choice**

### Ratings

- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended

## Pure Mathematics — *The solution of abstract problems using mathematical symbols*

**M**athematicians require software to accept instructions and output results. MathCad, Mathematica 3.01 and Maple V5 can be given normal symbolic mathematics on which to work and they will output the answer in either symbolic or traditional mathematics form. These can then be copied to MS Word documents, making the laborious use of MS Equation Editor a thing of the past. Macsyma does not have symbolic input but will output symbolic maths which can be copied to other Windows applications.

There are two distinct methods of approaching the solution of equations: numerical and symbolic evaluation. All the packages on test have facilities to solve systems of linear equations, non-linear equations, differential equations (...you name it) either symbolically or numerically.

### Symbolic evaluation

For symbolic evaluation, Mathcad relies on a cut-down Maple kernel which, beyond a given level of complexity, will require an add-on package such as the Numerical Recipes Toolbox.

There is little doubt that the other packages have a stronger abstract symbolic capability but the obvious question for any potential user is whether Mathcad, which scores on ease of use, has sufficient symbolic capability to handle the job.

Maple, Mathematica, and Macsyma all include advanced number theory routines as standard, but this is one area where Maple and Mathematica are way out in front. Which of the two to choose depends upon the nature of the task. Maple, for instance, will factorise large numbers faster but Mathematica "nextprime" can run larger numbers (10,600+) more quickly.

Mathematica and Maple can both output the first 60,000 digits of Pi, while Macsyma can manage the first 10,000 digits without problem but MathCad, being limited to 3,900 digits, is less useful for such work. Derive for Windows is a disappointment in this area, outputting large numbers in a single line which goes off the screen!

Mention linear algebra and most people think of crunching numbers in large matrices; an area in which Matlab (which is essentially a matrix engine) excels. Matlab

completely different aspects of computation — and Macsyma, Maple and Mathematica all feature standard libraries with many routines for handling matrices with symbolic elements. This is an area where Macsyma and Maple appear to be stronger, with larger linear algebra functions as standard.

### 3D mathematical art

Although some are lacking in 2D functionality, all of these mathematics packages can be used to produce impressive 3D graphics. Some of these 3D graphics are developing into a new art form and packages such as Maple Mathematica and Macsyma offer animated 3D rotations with a choice of viewing position.

The top honours for 3D mathematical art must, however, go to Wolfram, which now publishes coffee-table Mathematica art books. But when it comes to the really spectacular artwork of the Mandelbrot set and other fractal images, then Fractint from the Waite Group is really the only package to use. Visual users may want to play around with the Fractal Explorer in Kai's Power Tools, operating as a plug-in under applications such as Adobe Photoshop or Corel PhotoPaint.

For Linux and Apple Mac users, Mupad can be downloaded by ftp and is also available on CD, complete with handbook, for a mere £45 which makes it good value for money. However, there is no windows version as yet and MuPAD, although powerful, is not easy to use.

### Derive

Derive is the least expensive of the Windows maths packages, taking up just 2.3Mb of disk space and requiring 8Mb RAM. Within its limitations, it has a good mathematics capability and can produce impressive results. Texas Instruments has Derive installed as standard on the TI-92 pocket calculator, making it the best pocket machine for science. The last Psion product to feature a maths package was the LZ Organiser. This failure to include maths functionality comparable to the TI-92 has been a source of disappointment to many Psion Users.

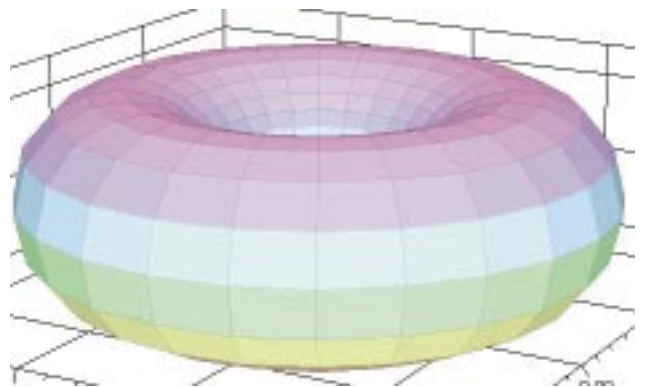


**Maple V5 has a strong 3D graphics capability**

itself has no symbolic capability but an optional Maple-based symbolic toolbox is available. Matlab is featured in our applied maths review (p126).

All the maths packages on test can perform operations on matrices with numerical elements, and Macsyma offers a high-speed Numkit package as an optional extra.

There is a second, possibly more important aspect to linear algebra — for instance, operations on matrices with symbolic elements such as  $(\sin(x)+ix)$  which require

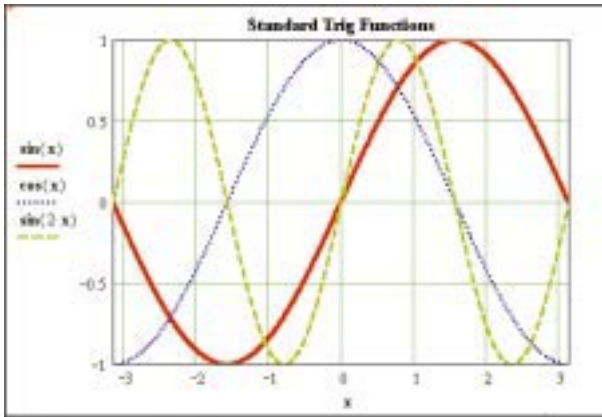


**A Macsyma doughnut for the coffee-table art department**

### Macsyma

Only slightly more expensive than Derive is Macsyma: a full-blown symbolic maths package with a notebook interface and click-on editing making it a much better buy. Macsyma is a well structured logical program which, although only a fraction of the price of Mathematica and Maple, is able to challenge these rivals in symbolic mathematics.

Macsyma is programmed in Lisp and can accept queries in plain English: ask it "how do I extract the eigenvectors of a matrix?" and it will answer you in English. Although Macsyma has neither the numerical capability of Mathematica nor the symbolic input of Mathematica, Mathcad or Maple V5, it will run on a 16Mb Pentium PC and provides a vast symbolic



Mathcad 3D graphics

mathematical capability, making it exceptionally good value for money at £180. If you don't need to calculate beyond the first 10,000 digits of pi or factorise numbers with too many digits, then Macsyma is the package to choose.

**Mathcad**

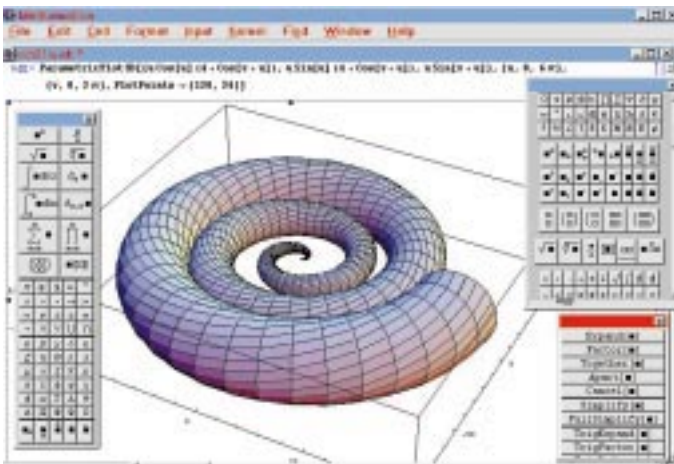
Next comes Mathcad. Although it has neither the same numeric or symbolic capability of Maple or Mathematica, it is less than half the price and is easy to use, with a good interface and a broad range of add-on toolboxes and application packs.

While the facility to perform a multiple 2D plot, or edit, label or legend the traces may not appear to be the most exacting of pure maths software tests, we think it is relevant. GCSE students should be able to plot curves, edit colour and legend the lines. But when it came to it, MathCad 7 was the only software on test do this with easy click-on editing.

**Mathematica**

At first, Mathematica could not be coaxed to pass this test but Wolfram Research replied with a series of command line edits featuring 56 assorted brackets, nested at five levels. Maple and Macsyma will plot and click-edit the curves but will not label the traces. MathCad 7, with its Resource Centre and MathConnex facility scores on range of functionality, value for money and ease of use, and while it does not have the same symbolic or numerical capability of its three rivals it has more than enough for most professional applications. For good performance MathCad 7 requires a Pentium PC or higher with at least 32Mb RAM.

Having had a disappointing, perhaps premature, initial release (v 3.00) Mathematica version 3.01 is much improved



Mathematica 3D graphics are in a class of their own!

$$G(x, x', y, y') =$$

$$\frac{\operatorname{Re} \left( \log \left( \frac{\partial_1 \left( \frac{\pi(x+i y+x'-i y')}{4 a}, e^{-\frac{a \pi}{b}} \right) \partial_1 \left( \frac{\pi(x+i y-x'+i y')}{4 a}, e^{-\frac{a \pi}{b}} \right)}{\partial_1 \left( \frac{\pi(x+i y-x'-i y')}{4 a}, e^{-\frac{a \pi}{b}} \right) \partial_1 \left( \frac{\pi(x+i y+x'+i y')}{4 a}, e^{-\frac{a \pi}{b}} \right)} \right) \right)}{2 \pi}$$

workstation software. This is an encyclopaedic 105Mb package with a heavyweight handbook and a companion MathSource CD-ROM with 100,000 pages of mathematical knowledge, making this Wolfram Research product a formidable mathematics resource by any standards. However, despite improvements to the interface it is still not exactly user-friendly. Although far quicker and more stable than the initial version 3.00 release, Mathematica 3.01 appears underpowered on anything less than a PPro or K6 200 with 64Mb RAM. Mathematica does, however, boast robust numerical routines and now produces better-quality symbolic output.

Logging on to Mathematica !

**Maple**

Many researchers and mathematics lecturers prefer to employ Maple, which is quicker and easier to use and requires fewer resources than its competitors, making it better suited for use on personal computers and lap-top computers.

We were provided with an exclusive beta preview of Maple V5 for this review, and although we cannot really compare a beta with finished products such as Mathematica v3.01, Macsyma 2.6 or MathCad Pro7, we were nonetheless impressed.

Without symbolic input or pasteable symbolic output, Maple V4 is under-featured for the money when compared to Macsyma. But on the basis of a quick evaluation of this beta, it looks as if Maple V5 could be the single pure maths software package which will be the best in every category. Offering symbolic input and output, high-end numerical and symbolic evaluation, high-speed number theory routines, click-on editing of 2D graphics, rotatable 3D graphics and handling large Mersenne Primes, this is software well worth waiting for.

According to Waterloo, Maple v5 will still able run in 8Mb of RAM on a 486, even though such powerful software performs far better on a Pentium or Pentium II with at least 32Mb RAM.

**PCW Details**

**Derive for Windows**

Price £146.88 (£125 ex VAT)  
 Contact Chartwell-Yorke 01204 811001  
[www.derive.com](http://www.derive.com)

★★

**Macsyma 2.6**

Price £211.50 (£180 ex VAT)  
 Contact Chartwell-Yorke 01204 811001  
[www.macsyma.com](http://www.macsyma.com)

★★★★

**Maple V4**

Price £934.13 (£795 ex VAT)  
 Contact Adept Scientific 01462 480055  
[www.adeptscience.com/](http://www.adeptscience.com/)

★★★★

**Maple V5**

Price n/a (due for release first half of 1998)  
 Contact Adept Scientific 01462 480055  
[www.adeptscience.com/](http://www.adeptscience.com/)

★★★★★

**MathCad Professional 7.0**

Price £464.13 (£395 ex VAT)  
 Contact Adept Scientific 01462 480055  
[www.adeptscience.com/](http://www.adeptscience.com/)

★★★★

**Mathematica 3.01**

Price £1,286.63 (£1,095 ex VAT)  
 Contact Wolfram Research 01993 883400  
[www.wolfram.co.uk](http://www.wolfram.co.uk)

★★★

**MuPad**

Price £52.88 (£45 ex VAT)  
 Contact Wiley Tubner 0800 243407  
[web.mit.edu/estradaaj/www/MuPAD\\_HTML/index.html](http://web.mit.edu/estradaaj/www/MuPAD_HTML/index.html)

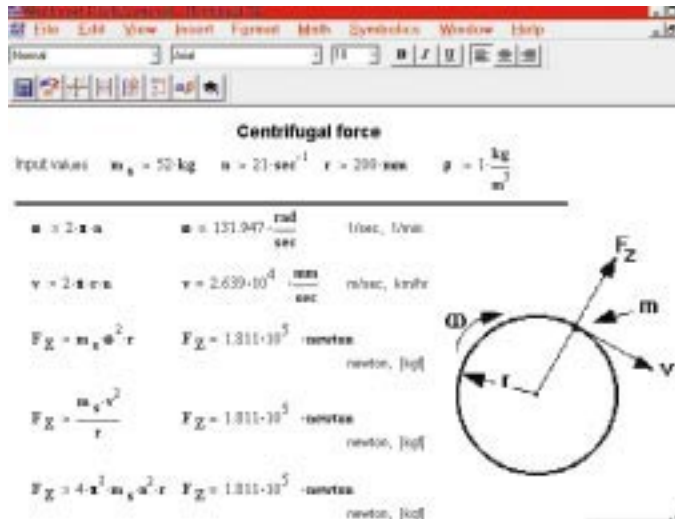
★★



## Applied Maths — *The application of maths to solve real-world problems*

**T**he choice of package to use with real data or applied mathematical situations really depends on the level of complexity and the amount of data available. We've singled out Matlab, MathCad and Mathematica.

A high data content or an extremely complicated real-time system simulation probably requires a Matlab



Simply change the variable values and the worksheet updates in this MathCad application

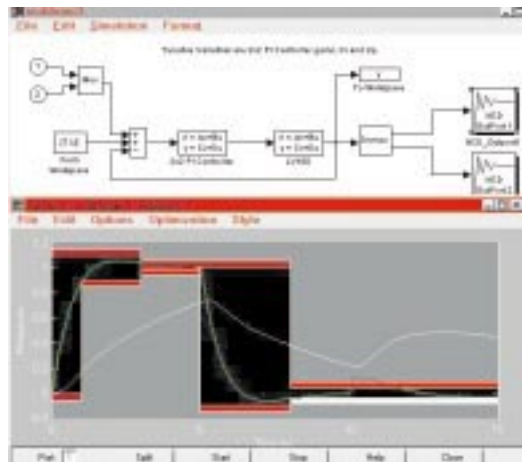
environment, whereas a simpler system may be handled adequately by the MathCad Connex package. While the evaluation of some formulas may require Mathematica or Maple there are many mathematics application areas, ranging from calculations of stresses and strains to rates of interest, for which MathCad is more than ample.

Matlab provides a mathematical environment analogous to installing Windows on a computer: you can "do things" with the base product, although most users take advantage of the numerous additional applications packages and dedicated toolboxes. Matlab users are provided with what is clearly the widest range of high-end quality application-specific packages; a range which spans many scientific disciplines. Signals processing, say, is one area with an obviously high data content. Although both Mathematica and MathCad have signals processing toolboxes, some DSP (Digital Signal Processing) professionals consider Matlab 5 to be the only choice and that other software doesn't even come close. Gerry Cain, Professor of Digital Signal Processing at the University of Westminster has said of Matlab 5: "The move from Matlab 4 to Matlab 5 was a staggering change." Professor Cain, who uses Matlab every day, thinks that "Matlab is a vital accelerator of technical productivity and of the emerging standard of communication between electronics engineers."

While real-time signals processing may require the power of the Matlab matrix engine, there are many areas of applied maths for which such an environment would be superfluous, and here Mathematica and MathCad come into their own with toolboxes and application packages.

Wolfram Research offers about 40 packages, covering areas as diverse as structural mechanics, control systems, wavelets which can be used for finger print and voice print identification, optics, fuzzy logic, mechanical systems electrical engineering and astronomy. These are powerful packages which make full use of the Wolfram Mathematica kernel. The down side is that they are not very user-friendly and an application specialist who was unfamiliar with the Mathematica system would find them almost unusable.

MathSoft, producer of MathCad, has an almost equally wide range of electronic application packages which have the advantage that they are user-friendly with no need for computer syntax. MathSoft has taken a number of classic



NCD filter simulation in Matlab 5

applied mathematics texts, for example *Gieck's Engineering Formulas*, *Roark's Formulas for Stresses and Strains*, *The CRC Materials Science and Engineering Handbook* and turned them into electronic handbooks. The user simply finds the relevant formula, enters the values onto the MathCad page, clicks on "evaluate" and there is the answer.

A unique new feature in MathCad Pro 7 is MathConnex which provides an environment for integrating and linking applications and data sources to create a computational system which can be used to simulate systems and view results. Applications which can be linked in this way include Matlab, Excel and Axum. Mathsoft has reasoned that there are many system application areas which require a small percentage of the capability of the Matlab Simulink system and that these simpler systems can be handled quite adequately by Math Connex inclusive with MathCad Pro7.

The use of mathematics in finance dates back to the days when Isaac Newton worked for the Bank of England drawing up tables for loan repayments. Nowadays, programmers work in the City developing customised routines for options trading. Many of these routines are based on the Black-Scholes model for option pricing: Macsyma has a Black-Scholes function as has Maple, MathCad and Mathematica. The Matlab Financial toolbox includes a whole range of functions based upon the Black-Scholes model. Wolfram produces two Mathematica financial packages, Mathematica Technical Trader and Finance Essentials, which are used by consultants in financial institutions.

MathCad produces a Financial Analysis package with almost 200 of the most widely-used routines.

Although Matlab 5 can be run on 24Mb RAM, a realistic minimum is 32Mb. A 64Mb workstation environment is recommended for all three packages.

### PCW Details

#### Matlab

Price £1,762.50 (£1,500 ex VAT) base package only

Contact Cambridge Control  
01223 423200 [www.mathworks.com](http://www.mathworks.com)

★★★★★

#### MathCad

Price £464.13 (£395 ex VAT)

Contact Adept Scientific  
01462 480055 [www.mathsoft.com](http://www.mathsoft.com)

★★★★

#### Mathematica

Price £1,286.63 (£1,095 ex VAT)

Contact Wolfram Research 01993 883400  
[www.wolfram.com](http://www.wolfram.com)

★★★★





Technical Data Analysis — *The presentation of technical information*

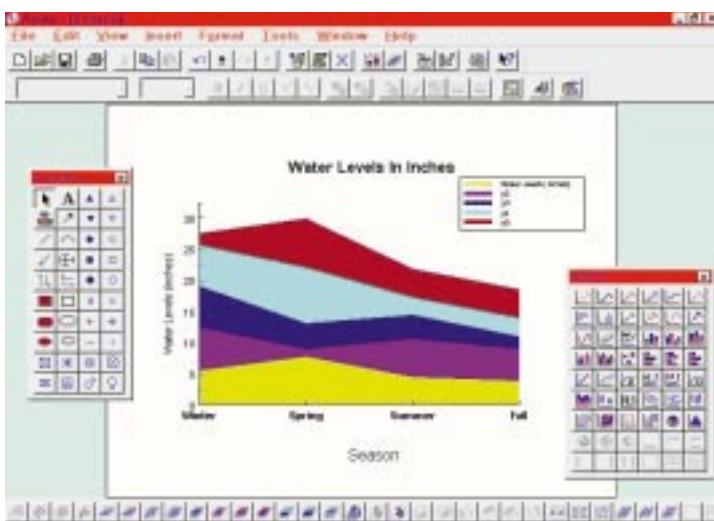
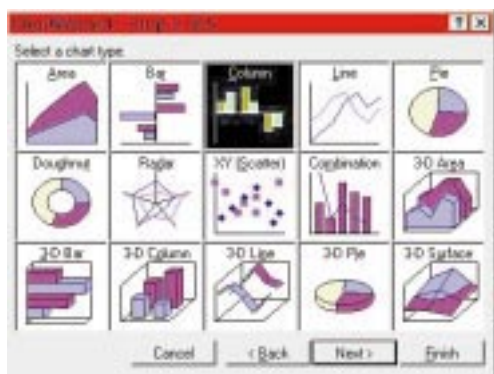
**T**he way information is presented is often as important as the quality of the data and analysis, hence the choice of software can be of paramount importance. Just because researchers work with experimental equipment is no reason why their data analysis and presentation software shouldn't be as easy to use as the front office WP package.

Specialised data presentation packages fall into two general types: those for online data capture and those for the presentation and analysis of static data. Online data capture is often essential for modelling and visualising an on-going process. Output is usually made to the computer screen so page editing is of secondary importance. DADISP, developed to monitor the real-time performance of Indy Race Cars is one such package. Origin v4 from Microcal is another, developed for the needs of laboratory calorimeters. There are many other packages used to visualise data gathered from instruments for chromatography and mass spectrometry: many of the larger instrument manufacturers providing their own dedicated software. Specialist firms such as Adept Scientific and Aston Scientific offer ranges of instrument-specific scientific software.

There is an overlap between the graphics capabilities of statistics packages and that of technical graphics packages like Axum, Origin 5 and Jandel SigmaPlot. Axum has hanging toolbars which permit simple one-click access to more than 50 2D graph types and over 30 3D graph types, and outputs

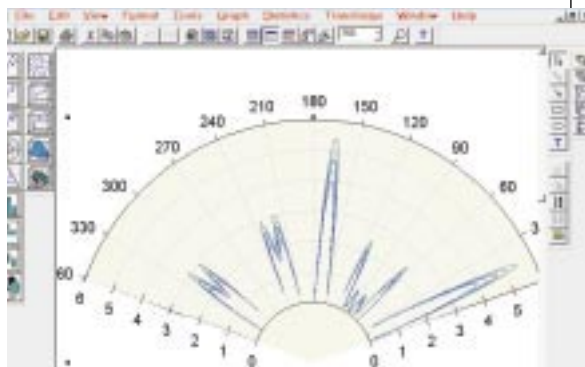
to a pre-formatted graphics page making the production of quality publications a breeze. Axum graphics can be combined and there are one-click "multiple graphs per page" options. There are facilities for non-linear curve fitting, and graphs can be presented in multiple-plot mode. Axum is not designed for time series data, though.

Excel offers a good range of click-on graphics templates



Axum area plot shows diminishing water supplies

Origin 5, which can open Excel, has superb handling of time series data and permits individual sections of a graphic to be enlarged. SigmaPlot is a very good European technical graphing program which can open Excel spreadsheets and apply Jandel graphics templates to highlighted columns. Both Axum and Origin can run in 8Mb RAM but 16Mb is recommended. SigmaPlot is a resource-hungry program



A Fan plot in Jandel SigmaPlot

best run on an NT Workstation, as is Origin if used with Excel.

Every computer should have a spreadsheet and Excel 7.0 is probably the best there is, with excellent data handling and a workbook format. There are many easy-to-access templates for data entry, all employing smooth dll routines which output the results to the Excel spreadsheet. There is a further set of advanced data analysis tools but these are "added-in" macros (with a clumsy, almost jerky feel to them) which increase memory overhead and deteriorate performance. If you're going to use these tools, it's best to run Excel on an NT workstation with at least 64Mb RAM and, preferably, powered by a Pentium II, K6 or similar. Running Excel 7 in Windows 95 with the data analysis tools can occupy, according to Microsoft Resources Monitor, over 100Mb of memory.

Excel's graphics are wizard driven and there is little the matter with the 15 graph types and almost 100 individual templates. The limitations of Excel are that graph types can't be combined, the software doesn't support conditioned or trellis plots and, more importantly, the graphs are not output to a formatted graphics page. Excel offers a massive range of functionality, but even assuming a workstation is available it is questionable whether it is adequate for serious work or whether more specialised software is needed. One obvious solution is to couple the Excel front-end to one of the many specialist packages which can either be run as an add-on to the Excel toolbar or OLE2 linked. Examples of such Excel-enabled software includes Matlab, Mathematica, Unistat, Origin, Arcus and Jandel SigmaPlot.

**PCW** Details

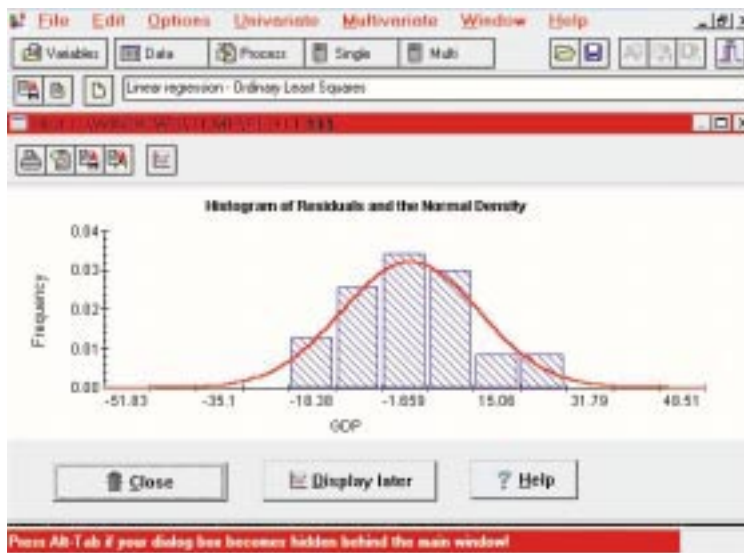
- Axum**  
**Price** £464.13 (£395 ex VAT)  
**Contact** Mathsoft 01276 452299  
[www.mathsoft.com](http://www.mathsoft.com)  
 ★★★★★
- DADISP**  
**Price** £1,762.50 (£1,500 ex VAT)  
**Contact** Adept Scientific 01462 480055  
[www.dsp.com](http://www.dsp.com)  
 ★★★
- Excel 97**  
**Price** £325.48 (£277 ex VAT)  
**Contact** Microsoft 0345 002000  
[www.microsoft.com](http://www.microsoft.com)  
 ★★★
- Microcal Origin**  
**Price** £517 (£440 ex VAT)  
**Contact** Aston Scientific 01296 614144 [www.astonsci.co.uk](http://www.astonsci.co.uk)  
 ★★★★★
- SigmaPlot**  
**Price** £411.25 (£350 ex VAT)  
**Contact** Jandel Scientific (+49) 2104 9540  
[www.jandel.com](http://www.jandel.com)  
 ★★★★★



## Statistics — Interpreting observations and data

**S**tatistics is about getting information from data. You have your data, probably in rows and columns, and you want to extract the absolute maximum of useful information. This is an area in which there is considerable overlap between mathematics and statistics software and although spreadsheets like Excel have essential statistics functionality, specialist capability is usually necessary.

Of the Maths Packages, Mathcad 7, covers 18

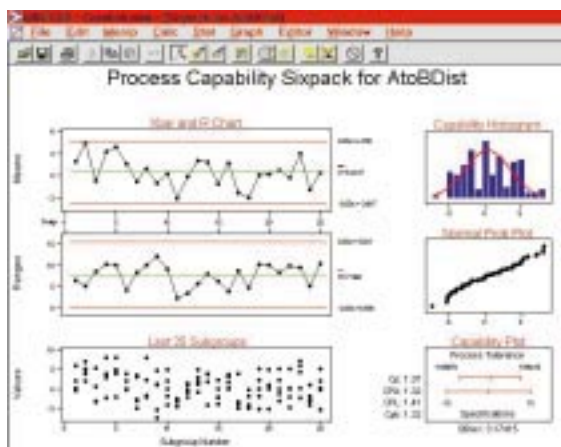


**Microfit offers one-button-specialist graphics output**

distribution functions and includes easy-to-use statistics quick sheets for summary data which can be pasted or imported from Excel. Mathematica Statistics can be linked to an Excel spreadsheet and has specialist statistics graphics, a good range of distribution functions, routines for hypothesis testing and advanced regression analysis. Matlab stats package has inverse and cumulative probability levels for distribution functions, descriptive statistics, linear models and analysis of variance. Macsyma and Maple also have a useful statistics functionality.

There are, however, information aspects which require more than a basic statistics approach. If specialist statistics functions or custom editing of graphic output with point identification or brushing is required then a more

sophisticated package is called for. If you need to be able to predict a future value with maximum certainty, you are probably going to need to use a Neural Network package, and while SPSS and Matlab both offer Neural net toolboxes, this is a very specialised



**Minitab Quality Control Analysis Output**

area often requiring dedicated packages.

If you have time series data consisting of a series of observations on inter-related variables, and want to analyse the relationships between these variables, then you need a good multiple regression package. Microfit is by far the best regression package available, including features for recursive regression and tests for ARIMA and advanced analysis of

residuals not to be found in other packages. However, it must be remembered that Microfit is specialist software best used in conjunction with a more general package such as Minitab or Unistat.

If you have time series data but are a little dubious of possible relationships between variables, perhaps suspecting an underlying pattern in the data, you'll want to analyse in meaningful terms using a package with a good ARIMA capability. Most of the better packages featured here have an ARIMA capability but this is where Statgraphics Plus from Manugistics is really in a class of its own. With a time series module, both state of the art and easy to use, Statgraphics makes the analysis and results readily accessible by non-specialists. Statistica and Mathematica Time Series Packages are strongly featured but Statistica is less than intuitive and the Mathematica module is designed for use by Wolfram experts.

Survival analysis is a relatively new form of statistical analysis developed from the need to analyse historical survival data. Imagine you have patients, some of whom receive one treatment and others a different treatment. Some may die, others may recover and leave your program or die of other causes. Survival analysis techniques are designed to compare the efficiency of two or more treatments and can be used to compare different maintenance programs for machines or failure rates for items such as printers.

There are different approaches to survival analysis, ranging from relatively simple Life Table Analysis, Kaplan-Meier and Lee-Desu, which are included in almost all statistics packages, and then there are the state of the art Cox Regression models available in S-PLUS, SPSS, Statistica, StatView and Unistat 5.0.

A screen of multiple statistical analysis can become cluttered and the well-organised multiple panel output of Statgraphics offers the best screen from which to work. SPSS has also recognised this problem and offers a session tree which permits click-on access to previous analysis. How data is output is also important and a good package is one which will integrate well with other software. There is little point in having a statistics package which will calculate an ANOVA table or a covariance matrix at lightning speed if you then have to re-enter results to obtain a well-formatted report in MS Word.

Outputting to a document is an area where Unistat leads, boasting results in pre-formatted tables, directly pasteable in MS Word or Excel. S-PLUS has a click-on feature to integrate with MS PowerPoint, and SPSS produces table form output with scaleable fonts which can be copied and pasted to other documents. Minitab features a limited range of pre-formatted report output which can be copied and pasted to other documents.

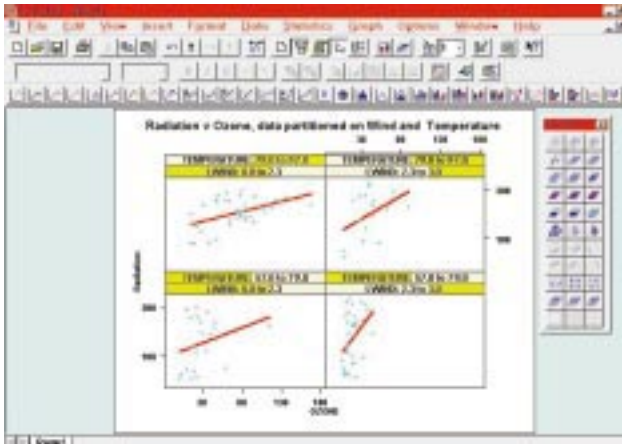
It should be noted that Unistat's facility to link with Excel and Word works perfectly with version 7 (ie Office 95) but, despite a 1.3Mb custom .dll from Microsoft, is slightly less solid in Office 97, hence Unistat users are advised to stay with Office 95.

### S-Plus

Looking at the available packages, S-Plus is by far the most impressive. Weighing in at over 70 megabytes, S-Plus is favoured by academic statisticians and has a compendious range of functions, customisable menu bars and excellent editable graphics routines such as conditioned panelling and trellis plots. Range of functionality is obviously an important aspect of any package and here S-Plus scores with depth and breadth of analytical routines with the additional advantage of the Mathsoft Axum Graphics engine.

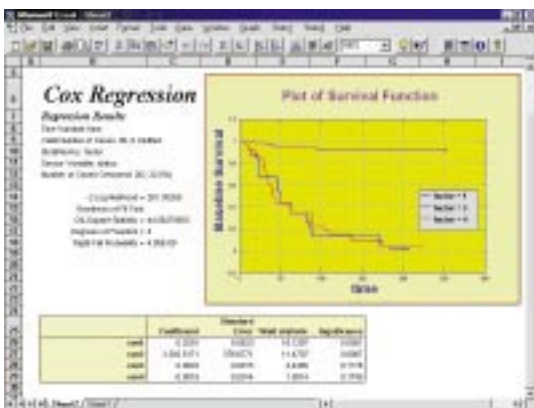
### Statgraphics

Statgraphics has a range of specialist modules featuring strong time series analysis, experimental design, quality control and multivariate methods. With features such as stat folios for combining sets of analyses and a stat gallery permitting graphics to be combined on a formatted page,

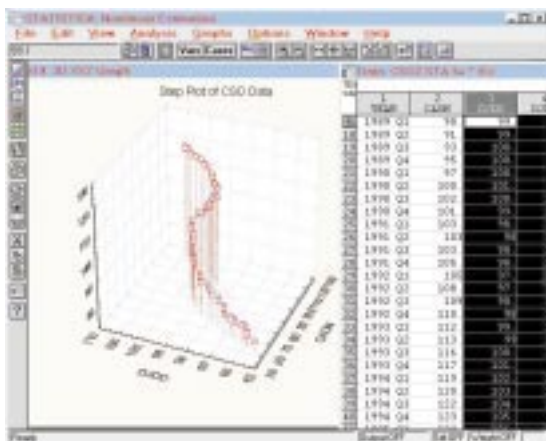


S-Plus graphics, showing multi-panel conditioned graph

Statgraphics is a strong, sophisticated, product. The quality of online help is important and here Statgraphics leads, with a context-sensitive StatAdvisor to assist in interpreting the results of statistical procedures. Although not technically speaking an "expert system" in the AI sense, it does provide expert assistance.



Unistat can perform a stratified Cox regression analysis and create a presentation quality report



Statistica 3D step plot — note the control box for spin

**Unistat**

Unistat is a compact program with the stress on ease of use and quality of output. It is often chosen by scientific researchers who value easy access to the routines which they actually use on a daily basis. Unistat works in conjunction with users to develop routines for specific problem areas. Unistat's Help offers advice on how to proceed and which routine to use, with worked examples from leading textbooks, as does Arcus Biomedical.

**Minitab**

Minitab is the most widely-used package for stats teaching and has good functionality with the accent on industrial control charts, quality control tools and reliability analysis, experimental design and multivariate methods.

**SPSS**

SPSS is a favourite package of UK local government and offers a solid range of add-on

modules with routines for survey analysis and cross-tab tables. While the SPSS base product is somewhat limited in scope, the add-on packs feature unique statistical tools. Although expensive, SPSS offers the best training facilities for new users, making advanced analysis accessible to non-experts.

**Statistica**

Statistica combines a very broad functionality with an exceptional range of graphics options. It can be complicated to use, however, and even experienced researchers can find the interface confusing. While Statistica offers a prodigious range of functionality and five volumes of documentation and on-line examples, it is not the most accessible package and it is seldom the first package I turn to when I need to analyse statistical data.

**Arcus Quick Stat and StatView**

Medical workers and other researchers on a budget would find Arcus Quick Stat hard to beat, with basic descriptives, parametrics, non-parametrics, regressions and correlation analysis. Arcus also features ANOVA, crosstabs and survival analysis. This is the first release of Arcus for Windows and a version upgrade will be available on the internet for registered users. StatView from Cherwell Scientific is broader than Arcus and, with advanced regressions and 17 routines for industrial quality control applications, offers a more general statistics capability. Both StatView and Arcus rely on MS graphics tools for editing graphics output.

**PCW Details**

**Arcus Biomedical 1.01**

Price £282 (£240 ex VAT)

Contact Research Solutions 01223 425558

[www.ResearchSolutions.com](http://www.ResearchSolutions.com)

★★★

**Microfit 4.0**

Price £464.13 (£395 ex VAT)

Contact Oxford Electronic 01865 556767

[www.oup.co.uk/](http://www.oup.co.uk/)

★★★

**Minitab 11.2**

Price £816.63 (£695 ex VAT)

Contact Minitab 01203 695730

[www.minitab.com](http://www.minitab.com)

★★★★

**S-Plus 4.0**

Price £1,756.63 (£1,495 ex VAT)

Contact StatScience UK 01865

20095 [www.statsci.co.uk](http://www.statsci.co.uk)

★★★★★

**SPSS 7.5**

Price Base £816.63 (£695 ex VAT); base + modules £4,641.25 (£3,950 ex VAT) plus annual licence fee £1,116.25 (£950 ex VAT)

Contact SPSS 01483 71920 [www.spss.com](http://www.spss.com)

★★★★★

**Statgraphics 3.1**

Price Base £634.50 (£540 ex VAT); incl all modules £1,468.75 (£1,250 ex VAT)

Contact Bloomsbury Software 0171 436 9481

[www.statgraphics.com](http://www.statgraphics.com)

★★★★★

**Statistica 4.0**

Price £934.13 (£795 ex VAT)

Contact StatSoft 01234 341226

[www.statsoft.com](http://www.statsoft.com)

★★★★★

**StatView 4.5**

Price £468.83 (£399 ex VAT)

Contact Cherwell Scientific 01865 784800

[www.cherwell.com](http://www.cherwell.com)

★★★

**Unistat 4.5**

Price £816.63 (£695 ex VAT)

Contact Unistat 0181 964 1130

[www.unistat.com](http://www.unistat.com)

★★★★★



## Editor's Choice

**W**hich scientific software package to choose depends upon a combination of factors, such as requirements for the application area and subjective preference, not to mention disk space, value for money and available RAM.

For a solid maths reference, Mathematica must be the top choice. However, it requires a workstation environment and falls down on ease of use. Maple is far easier to use and is almost as capable although it lacks Mathematica's encyclopaedic breadth and does not have as many add-on modules. MathCad is the mathematics package to choose for technical professionals, teachers and students who require accessible symbolics without the need for advanced research. Macsyma is a powerful package with an all-round capability which can hold its own, both in numerical and symbolic calculations.

**Pure maths**

Maple v5 beta knocked spots off the other symbolic maths software, scoring a five-star rating. There is, however, a rule at PCW that beta software is not eligible for Editor's Choice, which was all that prevented Maple from winning. The **Editor's Choice** for pure maths is therefore awarded to **Macsyma** on the basis of an excellent symbolic maths capability in an easy-to-use front-end at a bargain price.

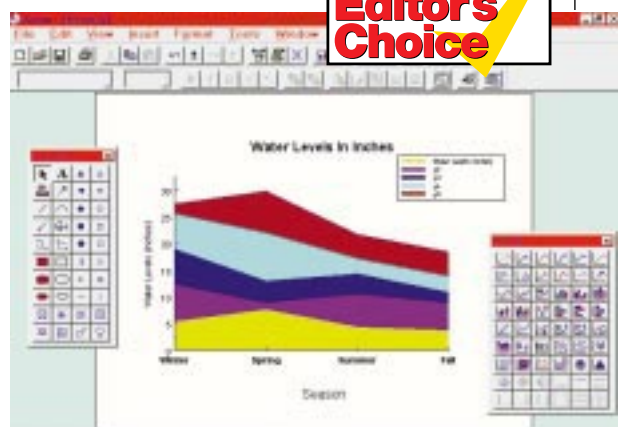
**MathCad** tied for our **Highly Commended** award, with **Maple v4**. MathCad scores for ease of use and range of add-on packages, while Maple V4, which can be run on a 486 with just 8Mb RAM scores for strength of symbolic and numerical routines.

Mathematica 3.01 is a quality package but, on balance, we decided that it is crammed with features that few PCW readers would ever need or use. We looked at Derive for Windows but were not over-impressed. MuPAD in Linux or on an Apple Mac is a low-cost option worth examining, but MuPAD is command-line based, meaning that it is not exactly user-friendly, and does not feature click-on editing.

**Applied maths**

**Editor's Choice** for applied maths goes to the MathWorks for **Matlab 5**, a package which is the most potent scientific software available. Matlab add-on modules are often superior to dedicated application software. The facility to use a full Waterloo Maple kernel as the Matlab Symbolic engine makes Matlab an almost unlimited system and the user-friendly GUI of its application modules gives it an edge over Mathematica, even in areas where the matrix engine is not needed.

The **Highly Commended** award for applied maths packages goes to **MathCad Pro7**. Mathcad came out ahead of Mathematica 3.01 (from Wolfram), on usability and value for money with the MathConnex module included in the £395 (ex VAT) base price. The strength and range of the Wolfram

**Axum is our Editor's Choice for technical data analysis**

Applied Mathematica functions is marred by the difficult syntax of the command-line interface.

**Statistics**

SPSS 7.5 is often considered to be the bench mark for statistics, but the full package plus annual licence fee is rather expensive and does not offer value for money. S-Plus 4.0 and Statgraphics Plus 3.1 both represent better value as does UNISTAT 4.5. These are three packages which score for ease of use, range of functionality and quality of output and, considering that one could buy all three for less than the initial cost of the full SPSS, there was little doubt about our decisions. Although still targeted at statistics graduates and other researchers, S-Plus no longer requires an advanced degree of computer expertise to make use of its powerful routines. **S-Plus 4.0** is consequently awarded our **Editor's Choice** for statistics, while **Statgraphics 3.1** and **Unistat 4.5** both win **Highly Commended** accolades.

**Technical data analysis**

The choice of technical data analysis software depends on user requirements and the nature of the data. The production of publication-quality graphics, if it is to be done well, clearly requires specialist software. We found that the specialist features offered by **Axum** (e.g. trellis plots and data conditioning) were the most useful and made it our **Editor's Choice**. **Microcal Origin** is a specialised laboratory software product but is best of its breed and merits a **Highly Commended** award, as does **Jandel SygmaPlot**, one of the rare occasions that Windows software from Europe measures up against the best from the US. ■

**Glossary of mathematical terms**

**A.I. (Artificial Intelligence)** The program "learns" a system so that it appears to be intelligent.

**ANOVA (Analysis of Variance)** A method of comparing the means of two or more samples by analysing how they've changed. Useful in analysing multiple effects.

**Command line edit** Where a command must be entered at the prompt (looks like DOS).

**Conditioned panel plots** Where a plot of data is broken down into sections, allowing you to see interrelationships between variables.

**Differential equation** An equation involving rates of change.

**Expert system** An application which uses AI focussed on a specific problem area. Doctors use expert systems in medical diagnosis.

**Linear algebra** The science of dealing with systems of linear equations.

**Linear equation** An equation which assumes straight line relationships between variables such as simultaneous equations.

**Matrix** A rectangular array of numbers or mathematical symbols.

**Mersenne Prime** A prime number of the form  $2^n - 1$ . The first Mersenne Primes are 3, 7, 31, 127 etc.

**NextPrime routine** Routine for finding the next prime number after a

given prime number. Useful for research into the density of primes and the frequency of prime number pairs and triples.

**Non-linear equation** An equation which cannot be converted to a simple linear form.

**Number theory mathematics** is applied to numbers and the relationships between them.

**On-line data capture** Where an instrument is connected to the parallel port on a PC to permit data to be "captured", saved and analysed as it arrives.

**Real-time system** A system which requires analysis of data "as it is happening". The "fly by wire" control systems of Airbus Jets and Boeing 767 planes are examples of real-time systems, as is the monitoring of the engines of Formula One racing cars.

**Robust mathematics** Where every numerical answer is double-checked before it appears on the screen. This makes the program slow to use but (in theory) every digit you get is warranted correct.

**Symbolic evaluation** Solving equations using algebra rather than calculating a numerical answer.

**Trellis plot** A multiple set of graph plots showing each of the inter-relationships between a set of variables as a separate plot.

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Computer  
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Reader awards		Name	
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Best software dealer			
Best hardware dealer			
Best PC supplier (mail order)			
Best telephone support			
Most reliable PC manufacturer			
Hardware awards		Manufacturer	Model
Best PC for business			
Best PC for the home			
Best budget PC			
Best notebook			
Best laser printer under £500			
Best inkjet printer			
Best monitor (from 17in to 19in)			
Best scanner			
Best modem			
Best graphics card			
Best sound card			
Best digital camera			
Best handheld/palmtop			
Software awards		Manufacturer	Title
Best software suite			
Best creative software			
Best web software			
Best accounting software			
Best utility			
Best reference/home CD title			
Best game			
Online awards		Name	Web address
Best internet service provider			
Best web site			

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Company \_\_\_\_\_

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# Where are the **IT** girls?

Despite recent growth, IT is an industry which still attracts more men than women. Deepa Patel looks at the reasons behind this and how the situation might be improved.

One of the most interesting and promising developments in today's world is the slow, but sure, equalisation of the roles between men and women. As history shows, men have had greater opportunities and, of course, more influence on society, especially in the areas of science and technology. This is not news but it is topical. Now it has become even more topical in our new computer-orientated age. If you go into any office, corner store or supermarket you will see women adeptly handling various types of computer ranging from a checkout scanner to a high-powered office workstation. But, it seems, that is as far as it goes when it comes to women's interest in computer technology.

Once most of these women go home they rarely use, or appear to be interested in, a home computer, especially here in the UK. Is it any surprise, one has to wonder, that there is a shortage of qualified IT professionals if women are not getting involved in the industry? The question is, why? From where does this perceived disinterest come? It is obvious that the advances which have been made in IT over the past 20 years have had a transformative impact on people's lives, both at work and leisure, but has the impact been as dramatic for women? If not, then why not? These questions have been dinner-party debating points for a long time. But what is the answer?

The answer, it appears, comes from what our children learn about IT from an early age, as well as the existing biases against women in today's IT industry. Many of our perceptions of what is interesting stem from school years, so we need to start with education; to look at what young men and women are studying and why. But we also need to examine the attitudes and issues which women face in the IT industry today.

## School for thought

There have been a number of studies carried out since the early eighties which look at female and male participation in the school curriculum. These reveal that boys study maths, science and subjects like computer studies from an early age, and this carries on through their school career. The A-level statistics for 1994 show that despite the fact there were more girls taking A-levels, more boys than girls did science-related subjects.

Research, carried out to look at why there are fewer young women taking these subjects, has revealed that a masculine image of technology, peer pressure and lack of confidence in their ability, plays a large part. Studies by the Engineering Council show that gender stereotyping and the perception of technology as a male domain starts at an early age. Science was seen as an activity carried out by men by 72 percent of five-year-old boys and 65.6 percent of girls. Only nine percent thought that women could be scientists,

ILLUSTRATION: Jake Abrams



**A common picture: national statistics show that young girls are still taking a back seat when it comes to computers**

while 67.6 percent of boys and 69.6 percent of girls considered hairdressing to be a female occupation. This essentially means that boys consider it the norm to follow these subjects. For girls who consider doing this, there is already a pre-existing feeling of isolation from technological subjects, which carries on as they become adults.

The education system is also finding that boys and girls learn differently. Girls prefer to learn by example while boys prefer to learn by theory. This was also expressed by Jan, a coffee shop manager, who attends an adult education computer class. She observed that her teacher, who is male, was slightly exasperated by the fact that she needed to have everything explained before she tried it. The trial-and-error approach that both boys and men have towards computers and other technology can often make women feel as if they are technophobic. As one young woman in a local youth club put it: "Boys hogged the computers at school" and "pretended that they knew more about them," so she felt stupid and no longer wanted to use a computer. Statements like this can be heard throughout the country's schools and are a good indication of the alienation that young girls and women feel from the whole area of technology.

The home environment also plays a role in the way young women perceive technology. A good example of this is toys. Young men are more likely to have been given toys with which they can tinker, while girls are generally given toys that are about relating to others. Girls tend to have more interest in the toy and its uses. As Ruth, a mathematics and technology teacher, said: "This is one of the factors that leads to boys developing an interest in wanting to know how things work, and girls being more interested in the end product and its use."

Parental and societal attitudes towards women's roles in technology also have an impact on what girls and boys can and cannot do. If you ask the question: "Who has more use or control of the TV remote control or the PC at home?" you can already guess the answer — the man, of the house. One young woman to whom I spoke said that she had never seen her mother use the computer.

All these issues can influence the career choices that women make. Jenny, a network manager said that when

she went to the physics club at school, she found she was the only girl there and after the first meeting never went back, even though she loved physics. She went on to study an arts subject before falling into IT at a later stage in her career. One initiative that has been tried is creating girl-only clubs which allow young girls to explore science in the way they want, and feel comfortable with. It may be seen as controversial by some but it makes sense to many, especially considering the success of girls studying science at single-sex schools.

Other factors, like the timing of subject option decisions, and the influence (or lack thereof) of career advisors and teachers, putting pressure on young people to decide early on what they wish to study, have been found to have an effect on the number of young women choosing IT subjects. It is important to ensure that more time is spent in training teachers to support young women and to challenge the gender stereotypes that both young men and women possess. Ruth also emphasised that to attract greater numbers of young women to IT, more emphasis will have to be put on how technology can be used, rather than how it is developed.

#### **Encourage the IT girls**

There have been some positive responses to attracting young women to IT. The National Council of Educational Technology (NCET) and the Women's Information and Technology Council (WITEC) have developed projects to achieve this. The NCET project held an IT camp-in for young women, which introduced girls to different aspects of IT such as the internet. The day proved to be very successful and showed that the internet can be used as an important tool in attracting young women to IT. They have also developed an information pack and a video for secondary schools. In addition, WITEC has a database of women working in science, engineering and technology, which means there are now more female role-models who can provide support and advice for young women interested in careers in these areas.

What seems lacking is materials for boys which challenge their assumptions about women. A common example is the idea that it is natural for boys to be drawn to science. This assumption is said to be transmitted either directly or unconsciously to young women and, hence, deters them from being interested in IT. The women I spoke to who had attended all-girls schools in their youth, echoed these sentiments. Many said that when they entered higher education they began to experience some of the stereotyping about women and technology and, as a result, often lost confidence in their ability to study IT-related subjects because they did not approach IT in the same way as men. Karen, a programmer with a large multinational company, said that she wanted to be able to talk about the way she was going to do something, whereas the men she was with tended to work on their own and not discuss the issue.

Figures for higher education show why it is necessary to have these projects. According to the Universities and Colleges Admissions Service (UCAS), only 17 percent of

students involved in computer studies courses are women. Any way you look at it, this a ridiculously low level of participation and illustrates that there is more work still to be done.

The NCET maintains that it is not necessary to have a degree to go into IT: judging by the women IT professionals to whom I spoke, this was the case for half of them. Sarah, IT project manager at a major national bank, is a prime example. She said that she fell into IT while doing a temporary job after leaving university and learned all her IT skills on the job. In her case, the man in her department who was meant to do the IT support work left after two weeks. She was promoted because it was felt that she would be able to relate to the clients, most of whom were women, who needed IT support.

Jenny, too, started her career as a temp and moved into IT. She has spent a good deal of time working to solve hardware-related issues, but confirms that there is still much work to be done to overcome the perception that computers are a man's domain — especially if you happen to be a woman working in that domain. She tells

**“The IT industry can be massively sexist...mainly due to the background culture of IT managers”**

Peter Kirwan, editor,  
*Computing*

a story about how the male technicians never allowed her to go near the network cabling cupboard, and whenever she asked questions about IT she was given an answer which made her feel as though it was too complicated to understand. It was only when she was in charge of the overhaul of a computer network that she discovered the job was similar to that carried out by telephone operators in the forties.

So how does this lack of encouragement for more female involvement in IT affect Britain today? Judging by the statistics, not so well. Only 22 percent of the IT professionals in the UK are women. If you contrast this to the US where 45 percent of IT professionals are women, and then look at Singapore where the proportion jumps to 55 percent, you realise something is definitely askew. The figure drops further if you look for female managers.

One of the women with whom I talked was the only female manager in a team of 30. She felt that on the positive side she was noticed, but that the men around her were also waiting for her to make a mistake. Although she enjoyed her work and would not be doing anything

## Games for the girls

Kelly says: “I don't play computer games because they are all about fighting.” This is a typical young woman's comment about games. So off I went to the local games store to explore what kind of games were available. One of the first things that struck me was how most of the games were about power and control. As Kelly said, she liked playing those games when she was feeling angry, but wished there were more games aimed at young women. The few that are available seem to have an educational slant to them.

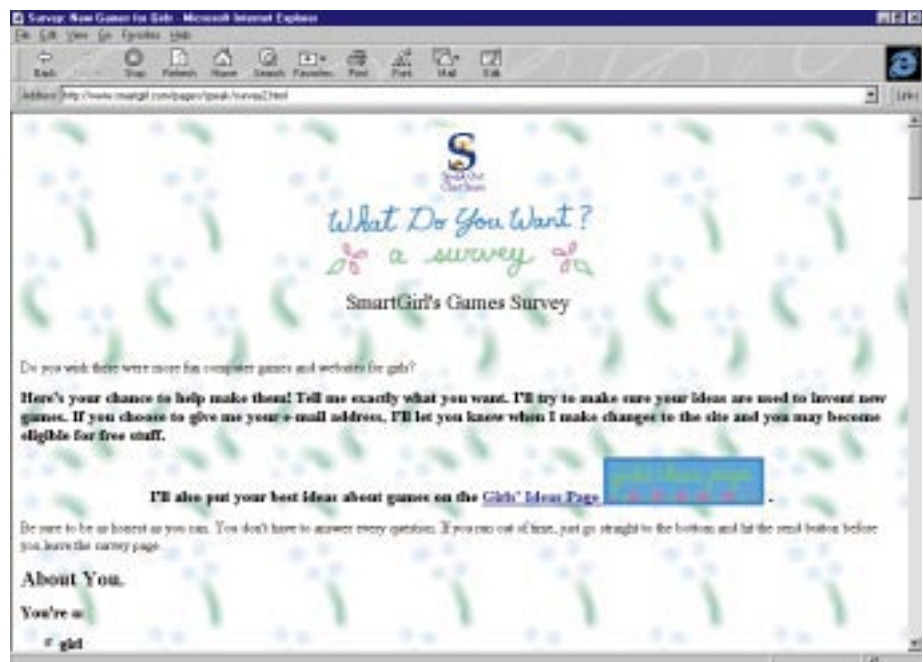
So why are there not more games for women? Stephen McGill, consumer product manager at Microsoft UK, said that although there are few games targeted at young women, Microsoft is creating more female lead figures in all their games to which young women could relate. Sadly, popular characters like Tomb Raider's Lara Croft reinforce stereotypes of the way women should look. Microsoft and Dreamworks are looking at developing more “normal-looking” female characters in the future. They have released a game called Goosebumps: Escape from Horrorland (which is based on a popular children's TV programme) in which Lizzy, the 12-year-old lead character, sets out to rescue her young brother and his friend. With this launch, Microsoft's intention was to engage young female games players. When I mentioned the game (while at a youth club) the young women there said they would like to see it, although one of the young men was more interested in whether you could blow people up.

One interesting point about offering both male and female lead characters for players to choose, is that the young men in the group to which I spoke rarely picked the female leads, whereas the young women seemed more willing select a male lead.

A most encouraging development I discovered was the games reviews on the SmartGirls web page which appealed to teenage girls. The main rule was that “the games must not force the user to play a female character”. They also run an interactive software company, called Girl Games, which designs CD-ROMs specifically for young women. Both of these are Australian initiatives, showing that there are more encouraging projects outside the UK.

The UK games industry does seem to realise the importance of attracting more young women by developing female characters, but the next step will be for them to develop games specifically for women.

■ SmartGirls is at [www.smartgirl.com](http://www.smartgirl.com)





else, she felt that there was a lot of scope for improvement in male-versus-female perceptions. Even though the IT industry is still quite young, it is no different to more traditional businesses: it is run mostly by men, and there are staggeringly small numbers of women in top positions. Two of the women I asked felt that they had missed out on promotion because of their gender, but thought this would be hard to prove.

#### Out of the loop, out of IT

Peter Kirwan, editor of *Computing*, agrees wholeheartedly with this view. His publication has been running an aggressive "Women in IT" campaign to highlight the issue and raise awareness of the potential results of not attracting women to the IT industry. In his opinion: "The IT industry can be massively sexist...mainly due to the background culture of IT managers." He attributes much of the bias to the "real or perceived" effect of the "skills break" which women might take if they choose to have children. Once they have been out of the IT loop for a while, they are viewed to be behind in their knowledge of the industry.

Rightly or wrongly, this appears to be the reality. The problem with this reality is that it does not solve the issue of the shortage of skilled IT workers. As Kirwan says, the shortfall of skilled IT workers is only now being fully realised, especially with the year 2000 bug looming over every business. He says the industry is "about a year away from difficult shortages" and that attracting women would "clearly be a net addition to the workforce."

Further research has revealed that women feel isolated in these male-dominated environments. Unfortunately, this often means that once there, they don't stay long. Why? In Ruth's view, women just have

different priorities: "They work to live, not live to work." Sarah reinforces this view with her observation that many IT jobs, though very well paid, require long hours. Because of the differing views about what is the greater priority, work or home, it can be difficult for women to become more involved in IT careers.

On the positive side, there are more women becoming involved in the IT industry at project manager level. The reason for this, it seems, is that the need to negotiate and communicate felt by women attracts a higher proportion of them to this type of position. Jo said that nearly all the women within her department were in these roles.

One of the things which attracted her to this position was that it was not a technical post and it involved working with people. Both Jo and Jenny emphasised that their job interest lay in how their work with computers would improve things for people (in preference to development of the hardware). Yet these "people skills" are often devalued within an industry which places more emphasis on technical skills. Sue said that it was only when she attained the position of manager, and was making decisions, were her communication skills seen as being of equal importance to her technical expertise.

#### Time for a change

All these things show that the IT environment, both consciously and unconsciously, can be a difficult environment for women to work in and can be undermining. However, IBM does have a programme to help women get support and skills to enable them to operate better in this male-dominated world.

There is an increasing number of initiatives to attract women into IT, but that is not enough. As author Frances Grundy points out in her book, *Women and Computers*: "Without more women, nothing can change. But this is not enough: there have to be other changes as well." These changes must start not with the new question of why are there not more women in technology, but what is the IT industry and the education system doing to attract more women? In the former question, there is the implicit assumption that it is the responsibility of women to do something about the situation. The latter puts the emphasis on the changes which the male-dominated industry, as well as our education system, needs to make to redress the imbalance.

Without a fresh approach, the situation will remain unchanged.

And considering the future of business, the IT industry and society as a whole, that cannot be good for anyone.

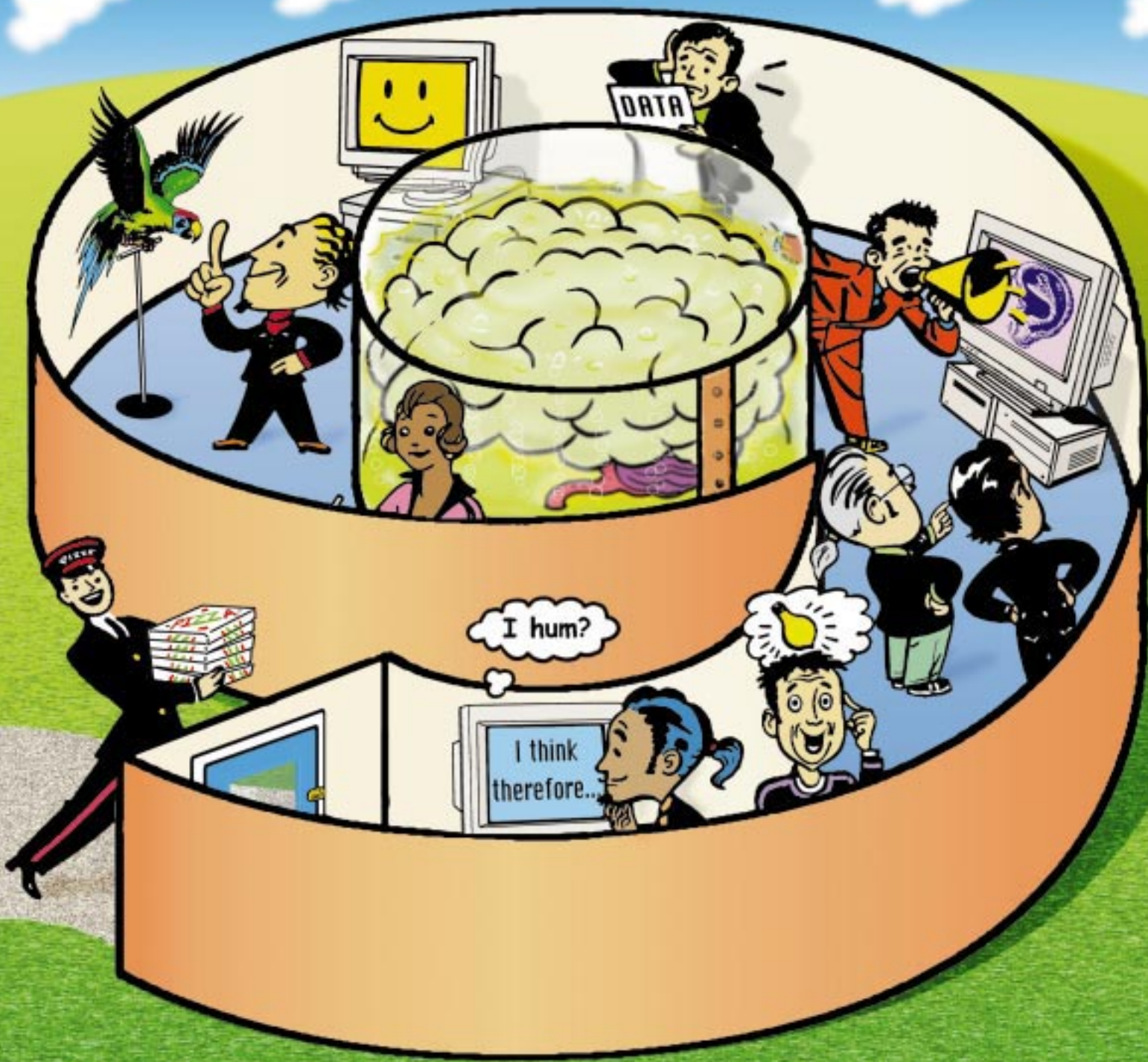
#### PCW Details

**Deepa Patel** is a freelance writer on issues relating to society and culture.

The **NCET** has produced information sheets on Gender and IT and Attracting Young Girls to IT, and can be contacted on 01203 416994 <http://ncet.csv.warwick.ac.uk>

**WITEC** can be contacted on [www.shu.ac.uk/witec](http://www.shu.ac.uk/witec)

*Women and Computers* by Frances Grundy is published by Intellect.



# On cloud nine

Sean Geer visits Building Nine of Microsoft Labs, the section given over to advanced research. He looks around and learns what's being developed there.

**B**uilding Nine looks like all the other buildings on the sprawling Microsoft campus. It has the same feel, too; labyrinthine corridors, earnest-looking people in heated discussion, rooms full of insanely complex-looking kit. But here, people have more on their minds than rushing products to market or developing new online strategies. This building is home to Microsoft's advanced research labs, the place where the company's technology for the future is being built.

"Labs" in this context is something of a misnomer. There are no signs of any laboratories, as such; nor, indeed, are there any white-coated, clipboard-wielding boffins to be seen in Building Nine. Instead, Microsoft's researchers are almost indistinguishable from their code-crunching companions elsewhere on the campus: lacking the beards and sandals of the hardcore developers, perhaps, but occupying almost identical cubicles in the seemingly endless corridors.

ILLUSTRATION: Paul Shorrocks

Many of Microsoft's employees work alone, with only a sofa-bed and a stack of empty pizza boxes adding to the decor of their allotted space, but many share offices too. In these tiny rooms work some of America's most talented research scientists. Alongside their counterparts at Bell Labs, MIT, IBM and many other organisations, these people are pushing computer technology as far as it will currently go, and they intend to push it a lot further than their competitors.

There's a lot at stake here. If the inhabitants of Building Nine get it right, they could end up building truly intelligent, perhaps even conscious, computers — a prize without value. This is about more than building a newer, flashier Windows interface and better networking technologies; it's about building computers that can recognise users, understand what they say and mean, speak to them and even make decisions of their own. Ultimately, perhaps, it's about building a computer like Arthur C Clarke's HAL 9000, anti-hero of *2001*.

These are issues which transcend the worlds of business and consumer software, which is precisely why they're being vigorously pursued by other research organisations, many of which have a reputation and kudos that Microsoft lacks. MIT and its Media Lab, Bell Labs, IBM, Xerox PARC, Stanford and Carnegie-Mellon universities, to name but a few, are all high-profile, big-budget concerns that have for years produced ground-breaking technology we all take for granted. They continue to develop agenda-setting technology — in many cases more advanced than that produced at Microsoft — but their focus is broader and, perhaps, their research ideals purer. In some cases, they just haven't had the commercial nous or experience to bring ideas to market: IBM, for example, invented the SQL database language but wasn't in the mass-market database software business and never quite worked out how to get into it.

Microsoft is more visible and ruthlessly commercial. It also has a couple of operating systems and a vast number of popular products towards which it can direct the results of its research, either as individual components or as a currently undefined whole. It can get it onto more desks than anyone else, faster than anyone else, a fact that will continue to be of interest to the US Department of Justice.

The group's corporate backgrounder states, in typical fashion, that it is: "Reinventing the

personal computing experience through research innovation", going on to talk about the creation of "unique synergies" that will result in the development of inevitably "richer" products. So far, so-so: "Improving the end-user experience" is part of the standard Microsoft litany recited by most of its executives and product managers for many years. But on the face of it at least, Microsoft Research seems an organisation in its own right, adopting a different approach to new technology from the development groups elsewhere in the organisation. Founded in 1991, it's run by Rick Rashid, an émigré from Carnegie-Mellon University who, as professor of computer science, worked on the famous Unix-based Mach operating system in the eighties. He was charged with an unusual task: to create a research group with the atmosphere and focus of a university research lab, but which produces new technology for incorporation into a wide range of commercial products.

"I used the model from my Carnegie-Mellon days to build the group here," says Rashid. There's a certain smugness in his voice when he says: "People told me I'd

## Speak and be heard

Speech technologies are at the forefront of Microsoft's research into making computers easier to use. There's little doubt in anyone's mind that speech is a more satisfactory interface between people and computers, and a vast improvement on the clumsy mouse/keyboard combination. Neither is there much doubt that at some point we'll be able to build computers which can not just understand what we say, but reply to us in a conversational manner. That's a long way off, but research is getting us to the point where speech recognition is a useful tool.

There are working products today but they still have drawbacks. For a start, they require a lot of training before they will reliably respond to individual operators' voices; each program requires you to practice saying particular words or phrases before they will operate accurately. They operate badly in noisy environments, need huge dictionaries to be of any real use and have limited error-checking capabilities. Microsoft's WHISPER (Windows Highly Intelligent Speech Recogniser) technology is not yet, and may never be, a shrink-wrapped product, but the company is trying to advance the status of such programs to the point where they can be included in future operating systems and work with all applications on the desktop.

At the heart of WHISPER is a recognition engine that registers the amplitude, duration and pitch of the sounds it picks up. From these, it can start to make sensible guesses about what a word is and how it should be written on the screen. Problems arise when the system picks up homophones, words that sound the same but are spelt differently and mean different things. To deal with this, WHISPER uses context-dependent modelling to determine which word makes the most sense in the context, by looking at preceding and following words and applying some simple grammatical rules. When used by an experienced operator of a well-trained machine, WHISPER can correctly interpret a sentence such as "We need to write a letter to Mr. Wright right now" every time. Current research is focusing on providing intelligent ways of checking sentences for logical errors — catching gender mismatches at the beginning and end of sentences, for instance.

But what about computers which can talk back to the user? Making machines that can talk is possible, as anyone who's heard Stephen Hawking's mechanical voice will know. Making them talk like humans is more difficult, and making them actually converse intelligently is harder still. Microsoft's WHISTLER (Windows Highly Intelligent Stochastic Talker) technology, based on the WHISPER engine, represents a first step towards these developments. The trick is to make the computer mimic the acoustic characteristics of a particular human voice; in particular, the pitch and duration of sounds and the pauses between them (characteristics known as prosody). Prosody varies between one voice and another and is extremely complex in individuals, depending on exactly how individual words and sounds are spoken and pronounced. By transplanting prosody segments from one person's speech and overlaying them on a sample of text to be read back, WHISTLER can synthesise speech that sounds pretty close to the original person's voice.

The drawback is that this only works well if the speech segments are known beforehand — that is, if the text from which the prosody was originally recorded is the same as that to be read back. The problem is caused by the fact that recording the prosody from a person's entire spoken vocabulary in a number of different contexts is more or less impossible, and artificially-generated prosody is not as good as the real thing. So for the time being, WHISTLER's capabilities are limited. Even so, Microsoft has already been able to make it sing, a sure sign that the technology is improving steadily.

never build a great research group in Redmond — you need to be in Palo Alto or Cambridge [Massachusetts, not England].” But build one he has, despite early scepticism that Microsoft, of all people, could do “real” cutting-edge research.

“People would look me and Nathan [Myhrvold, Microsoft’s chief technology officer and Rashid’s boss] in the eye and say: ‘Are you really going to do this?’ Now, we’ve got some of the best researchers in the world. We’re very focused on the sort of topics you’d find in a typical university research lab. If you’re a researcher, one of your driving forces is ‘How do I get my work to make a difference?’” This is a question to which he knows at least part of the answer. Digital’s AltaVista search engine still runs on code he wrote in 1985: good evidence that he knows how to turn a research project into products with lasting commercial applications. In the Microsoft context, he still seems to have the knack: “Any product which Microsoft produces today has something in it that came from this research group,” he says. An example is the Office Assistant technology in Office 97, based on the efforts of those working on natural-language group and decision theory.

In keeping with the collegiate atmosphere that Rashid has engendered, the department behaves in a decidedly



**Rick Rashid, an import from Carnegie-Mellon university, heads up the Microsoft Research team**

open and academic manner. In time-honoured fashion, the research group’s work is published in open forum at conferences and seminars, and in technical publications. Researchers are even encouraged to write magazine columns where appropriate. “Open” is the key word here. “We just send in the papers, with absolutely no lawyers,” claims Rashid. So what’s to prevent other people stealing their ideas? Well, nothing at all. But Nathan Myhrvold,

## The meaning of life

Never mind being able to understand what people say; what do they *mean*? That’s a big challenge, and one that’s being pursued by researchers all over the world. At Microsoft, Lucy Vanderwende, one of the theoretical linguists hired from IBM in 1992, is trying to teach computers to understand language in the way that people use it. Natural language processing is already used in some MS products: most notably in the Office Assistant in Office 97, which lets you type English-language queries to find help on certain subjects. Elsewhere, such capabilities are already used in specific areas like weather systems and ticketing agencies, where vocabulary is limited and the number of answers to questions such as “What’s the weather like in Idaho?” or “When’s the next flight to Gatwick?”, is limited.

The biggest difficulty facing Vanderwende and her team is that language is inherently ambiguous. Humans resolve such ambiguities instinctively and incredibly quickly, based on our knowledge of context and the real world. Many of the words we know are not just



nouns or verbs but complex concepts with many different associations. Explaining those things to a computer is tricky. Vanderwende’s team has had to develop new theories of grammar, borrowing bits and pieces from other people and applying them to the text from two entire dictionaries. The system they’ve built, called MindNet, takes typed-in sentences and creates a “syntactic sketch” of their structure. These complex-looking sketches split sentences into their grammatical components and into the likely relationship of the words they contain and their relative importance. In the process of building the sketch, the MindNet software examines word definitions and looks for a context it can apply to its sketch to help resolve ambiguities.

An oft-quoted example is the phrase “I saw the mountains flying over Seattle”. MindNet can work out that it is the “I” which was flying over Seattle, rather than the mountains. This seems obvious to us, but is hard to explain to a machine which understands logic but not language. It works this out by determining that, according to its dictionaries, things which fly include animals of various kinds, planes, and people (who sometimes refer to themselves as “I”) but not geographical features like mountains. This sounds far more straightforward than it actually is; in reality, the system uses an advanced combination of raw word information, grammar, syntax, semantics and discourse to work out the real meaning of a sentence.

Vanderwende says that MindNet’s initial visual representations of sentence structure made a massive impact. “Being able to visualise the net was a huge step forward. Once we had the links, the lights started going on.” The next step, she says, is to add common-sense reasoning to the system. Other people are already trying this: Cycorp, based in Texas, has a system called Cyc that includes not just dictionary definitions but hundreds of thousands of common-sense assertions such as: “When you run, you move faster than when you walk”. In such ways, researchers think we’ll find ways to build computers which can learn and converse intelligently with humans. It’s brute force, rather than an understanding of lofty consciousness issues, that will make this stuff work. “We’re sticking very close to the computer, using our spare time to dream,” says Vanderwende.



**Nathan Myhrvold, chief technology officer, expects to have a few ideas stolen**

says that this is not a problem. "The whole point of research is to take some risks and that means you're going to have some failures. People who are worried about losing a few ideas are people who don't have many ideas! So we may lose a few, but we'll get quite a few, too."

Right now, those ideas are generated and absorbed by about 240 researchers, which is "...more than the computer science department at Bell Labs," according to Rashid. Most of these have come from highly-respected academic research backgrounds, especially from

universities such as Carnegie-Mellon, Stanford and Berkeley. He plans to expand to 600 or so people by the year 2000, not including the 40 or so who will be hired to work at the new Cambridge lab in the UK, announced loudly in the autumn by Bill Gates. The various research teams are currently working on subjects as diverse as natural-language processing, decision theory and adaptive systems, speech synthesis, computer vision, advanced 3D interfaces, virtual worlds and cryptography.

These areas are interesting enough in their own right, but few of them will deliver discrete products that can be put in boxes and sold to punters, despite the fact that the technology is ready enough. Microsoft's continuous speech recognition work, for instance, is more than advanced enough to form the basis of a product which could compete with Dragon Systems' Naturally Speaking or IBM's ViaVoice. But Fil Alleva, a member of the speech group, says that that's not the point. "We don't just want to do a me-too product. It's more important that we get

the technology right and can figure out how to get it to work at a system-wide level." And this seems to be the message of MS researchers. Individual achievements are impressive enough, but taken as a whole they add up to something considerably more than the sum of their parts.

Critics of Microsoft's research approach argue that much of it is not original. Instead, in common with the rest of the company's *modus operandi*, it relies on the "embrace and extend" philosophy which is taking existing ideas and technology through acquisitions of people or companies, and advancing them for its own devices. Indeed, some of the research departments and their work have been transplanted wholesale from other companies. The natural languages group, for example, was swallowed up wholesale when IBM "downsized" its research operation in 1992.

Other criticisms, that Microsoft's work is way behind that of other people, are cautiously acknowledged even within the company itself. Steven Shafer, a senior researcher into computer vision, showed me an impressive-enough demonstration of a machine that could detect and react to its operator in some small but useful ways, such as being able to switch itself on when it perceives a human presence and interpret headshakes to mean either yes or no. But he freely conceded: "You could have seen a better demo than that at MIT three years ago. The value of our research is that we're much more visible." Other critics say that the uneasy balance between pure research and harsh commerce is too stressful for pure researchers, who will leave in droves to return to the world of academe.

Nathan Myhrvold is adamant that Microsoft is at the forefront of a pure, original search for which the purpose is not yet clear. "We've just started an ambitious project in theoretical computer science. Now, most industrial research labs don't do a lot of theory — even a lot of universities don't do a lot of theory. To the extent that they do it, theoretical computer science has developed its own traditions. We are working well outside those traditions. So we hired a bunch of the world's best mathematicians to use some of the sophisticated techniques from mathematics to rethink the fundamentals of computer science." He says this might lead to new models of computation, new ways of thinking about and building computers which go beyond current understanding.

That, perhaps, is something which might persuade its detractors that Microsoft is a serious research establishment. Whether it will ever garner the respect that the industry's old stagers have, is another matter. Antipathy towards the Redmond giant is at an all-time high and it seems unlikely that the world's "serious" research establishments will give it any more credit than is absolutely necessary. Whether that matters or not is, again, another question altogether. Microsoft's researchers want to be taken seriously, but they also want to deliver technology that ends up in serious products, whether those are new word processors or truly intelligent computers. As ever, it's the users who will have the last word on just how good that technology is. ■

## Learning parrot fashion

Microsoft's research into advanced user interfaces involves a complex blend of technologies which make use of speech recognition, linguistics, decision theory, animation and 3D graphics that work together to create intelligent entities. The most visible example of the group's work is Peedy the Parrot, a computer-generated representation of a bird that can respond to commands and perform basic tasks. On a good day, you can ask Peedy to wake up and play you some tunes on his CD jukebox; ask him for something by Madonna or just some jazz and he will, theoretically, oblige. After several years of development, Peedy is still an unreliable companion. On the day I visited, he was especially recalcitrant and I was forced to watch a video of a past performance. On a good day, under quiet conditions and the patient attention of one of his creators, Gene Ball, he can only get it right about half of the time.

Nonetheless, Peedy represents the company's best-yet effort to create a natural way of interacting with a computer that involves no keyboard or mouse intervention. Peedy takes the command-and-control idea found in current speech recognition programs a stage further, providing an entity to which commands can be addressed, rather than a standard computer screen blindly responding to the sound of your voice. Currently, he accepts only voice input; the work of the computer vision group







# Thinking aloud

Having founded various high-tech companies, Graham Brown-Martin is, above all, a thinker with his own views on the net and future technologies. Michael Hewitt manages to snare a couple of hours of a busy man's time.

**O**f Graham Brown-Martin's career plan had gone as intended, he might now be orbiting us in the Mir space station. Either that, or standing in the middle of a field with his arm up a cow's backside. That he isn't is due partly to a man down the pub and partly to a maggot. Instead, Graham Brown-Martin — to whom I shall refer hereafter simply as GBM, because (a) his full name is a bit too cumbersome and screws up my spellchecker; and (b) it sounds like a species of nesting bird — has become a millionaire mover and shaker in the multimedia and "ultramedia" business, with fingers in various film, TV, music and art pies.

When the *Daily Telegraph* interviewed him recently, it set great store by the fact that he was born in Bletchley Park (in 1964): it was as if coming from the birthplace of modern computing had somehow given him a leg-up in the business, in much the same way that coming from Bethlehem does if you're in the religion industry. GBM, however, is dismissive of this. "Originally, I had no interest in computers. I wanted to be an astronaut, a vet or a pop star. I had problems with the educational system and, although I was a bookish child, I was diagnosed as hyperactive, which made it difficult to teach me. I got into trouble quite a lot, and was regularly caned."

Regular chastisement failed to quell his high spirits. Nor did it stifle his early, somewhat unorthodox entrepreneurial endeavours. When he was 15, GBM was expelled from school for selling "herbal products", at which point he fell in with "the wrong crowd" and moved into a squat. Fortuitously, so did a rogue Tandy TRS-80, with which he began to toy.

"At that time I was going through a reclusive phase, where I was doing nothing but fiddling with the computer and listening to music — I was keen on playing music, but didn't have the money to buy a musical instrument. Then, one day, I met this guy in a pub who was into video games. We got chatting, I told him that I knew how to use a TRS-80. He said that he'd pay me £1,000 to write a TRS-80 version of *Space Invaders*. I didn't really know anything at all about programming but I went off and figured it all out. Then I wrote the *Space Invaders* game, gave this guy the tape and the source code, and he gave me £1,000 in cash. That's how I got into computers."

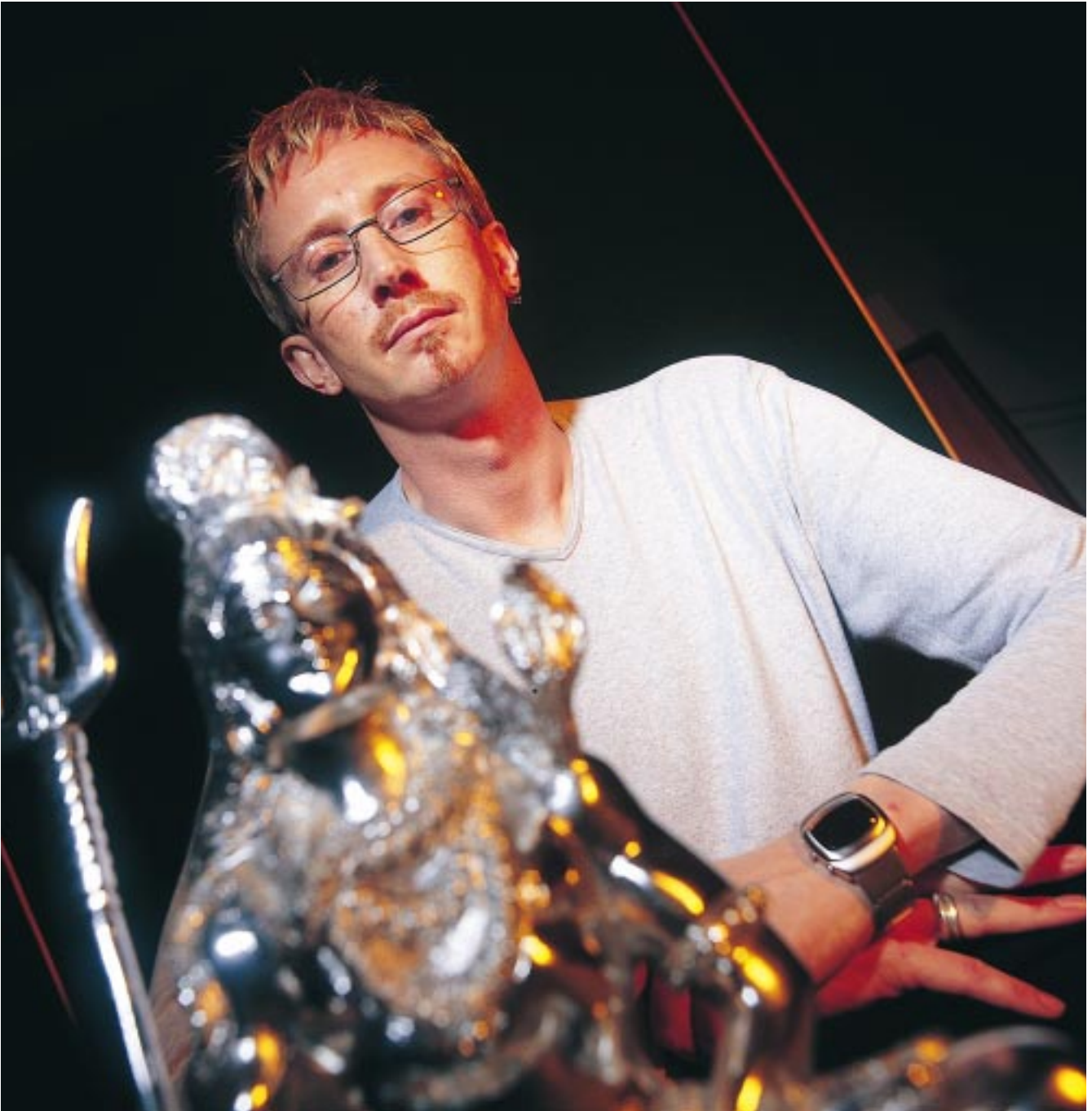
With the money earned here, plus some more pocketed for writing a couple of other video games, GBM bought a set of drums. These kept him occupied for a while. In time, however, he realised that banging them still wasn't enough. There remained a void in his life which, he realised, would have to be filled by "a proper job". So, persuaded by his parents, he left the squat for the post of lab assistant at the Open University in Milton Keynes.

"They wanted someone to work in their biology department. Now, it so happened that I'd already read up extensively on biology in my spare time and had kept pythons and lizards as pets. So, although I was by no means an expert, I had a fairly good background in the subject. At my interview, it turned out that one of the women on the interview panel was a herpetologist — a reptile specialist. I think that is what swung it for me."

Although billed as a research assistant, GBM's initial status was that of a grunt (his own word), responsible for clearing out Petri dishes, fetching cups of coffee and saying "Yes sir/No sir" as required. But in time, more responsibilities came his way and he became the lab's resident David Bailey. The Open University wanted to study the effects of radiation on fruit-fly maggots. GBM's job was to photograph them in their various stages of irradiated development. There was one problem, though: the fruit-fly's outer skin was difficult to photograph as it could not easily be detached from the innards. Some way had to be found to cleanly disembowel the thing so that it could be mounted on a slide.

"One day I came across some steak tenderiser — it works by breaking down meat proteins. I had the idea of injecting this into the fruit-fly so it would digest the insect from the inside, leaving its skin intact." It worked, and the Open University team were sufficiently impressed to persuade him to write up exactly how he'd done it for posterity. In time, the piece ended up at *Nature* magazine where it was published to great acclaim. From then on, scientists all over the world began addressing GBM as *Dr Graham Brown-Martin*. Overwhelmed by this adulation, he decided the time was ripe to move on.

"I didn't see myself as a biologist. I still had the idea of joining the music industry or being an astronaut. But it just so happened that during my time in the labs I'd been



in contact with another group in the university called the Academic Computing Service (ACS). At this stage, I was still writing software in my spare time: someone told me that if I joined ACS I could do this sort of thing and get twice what the lab was paying me. So off I hopped."

ACS was about writing software for academics and helping them to use the technology. For a while, GBM was in his element. "It was at this time that the micros-in-schools thing, a DTI-funded scheme, was starting to happen. It was essentially three British computer firms, one of which was Research Machines. I was writing software for them and got to know the people at Research Machines, who offered me a job."

Which he took, along with a healthy allocation of (then) modestly priced shares in the company. Over the next five years, GBM worked in a number of different areas,

including the much-hyped Domesday Project. This was a schools' project, to do with putting pictures and text onto video discs, a sort of "This is what it's like to live in the 20th century" sort of thing. It was GBM's first brush with what we now called multimedia, and he was hooked.

"I reckoned this was the future. I wanted Research Machines to do more work in this area but they weren't interested. It was at this point that I decided to call it a day. Besides, I didn't feel I could fit in there any more as the company had grown too big and become a little impersonal. And I'd just got married to a 'power puppy' with shoulder pads who worked in the company's marketing department. It was time to move on."

When GBM sold his Research Machines' share allocation, he discovered that he was now a millionaire at the ripe old age of 22. Rather than not letting it change

**Graham Brown-Martin enjoys tinkering with all things high-tech without having to draw up a business plan. He's a "thinker", he says, who doesn't think too highly of the internet**

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**“Yes, it [the internet] sells magazines and newspapers...but the idea that if you don't have a web site then you're going to go bust, is just so much bullshit. Very few people, if any, are making any money as a consequence of having a presence on the web”**

his life, he and his wife used the money to set up a company called Next Technology, the first in Europe to focus exclusively on interactive media. In due course, however, things began to turn sour: thanks largely to problems with suppliers, Next Technology eventually went under. As, concurrently, did GBM's marriage.

In 1991 he set up a company called ESP. “At the time, the music industry was being run by bean counters and largely sustained by releasing old tracks on a new format — CD. We had the idea of adding data and video to the CD to supply an interactive experience.”

ESP produced a plethora of interactive music titles, featuring bands like U2, Nine Inch Nails, and The Shamen. On the back of this, GBM set up a record label (EXP) in partnership with Virgin, to promote something called “suburban breakbeat”. But GBM and Virgin were actually dancing to two different tunes: he wanted to concentrate more on the interactive side, while Virgin was more interested in commercial, mainstream material. So GBM sold ESP to Virgin and moved on.

The next company, his current one, is called Hypersonique. Based at London's Elephant & Castle, it doesn't look much at first sight. There's just one room, stuffed full of all the highest-tech computers, videos and other such peripherals imaginable. And there are just two employees: himself and his partner, Buggy G Riphead. Yet this is effectively a multinational organisation which produces pop videos, CDs, interactive CD-ROMs, books, artwork... you name it. And quite recently, it beat off a challenge from George Lucas' Industrial Light & Magic to design a computer for the forthcoming film, *Lost in Space*. So with all these fingers in all these media pies, how come Hypersonique doesn't have a net presence?

GBM is highly dismissive of things internetish. “I believe it's a bit of a hoax. When you've been in the industry a while — any industry, not just computers — you see these things come up, surrounded by hype. It was the case with CD-ROM a few years ago when everyone was suddenly investing in it. So it is today with the internet. Yes, it sells magazines and newspapers, and there are lots of young people dressed in combat trousers putting homepages on it. But the idea that if you don't have a web site then you're going to go bust, is just so much bullshit. Very few people are making money as a consequence of having a presence on the web.

“Another problem is that it's so slow. Theoretically, you should have access to all the world's knowledge. But there's so much dross travelling up and down the internet, what with girlie .gifs and Uncle Tom Cobbley and all having enormous homepages, that it slows the whole system. Hypersonique doesn't have a web site, and we won't be adding to the glut. But we will get involved

when the technology can deliver all the things we expect, stuff like full-motion video: none of this MPEG2 12fps garbage. But how long this will take, I don't know.”

Back, then, to the things that Hypersonique is doing at the moment. Among them, the work for *Lost in Space* starring Gary Oldman, William Hurt and Hypersonique's specially designed computer. Or rather, its specially designed visual conception of a computer going through its calculations.

“The producers wanted a computer that was more funky than the flashing lights of HAL in 2001— *A Space Odyssey*. So we had this idea for a cyber-organic creature that lives in what looks like an aquarium on the deck of the spaceship. It's a sort of visual representation of the computer's thought processes as it continually monitors everything going on in the ship.”

The same sort of computer technology that went into the *Lost in Space* film project is also used by Hypersonique in other areas. For instance, while I was there, they were digitally processing a video tape of some singers in action. The original recording (a girl wearing angel wings and emoting into a microphone) looked pretty straightforward. But once the computer had finished with it, it took on a distinctly surreal, unearthly quality which apparently is in keeping with the group's style of music. This, I was told, was destined to be an interactive title, *Angels Landing*, by the group Salt Tank.

Then there is a new concept called ultramedia. “It is another way of looking at information using different types of sensorial data. It could be graphics or it could be sound. Whatever. Think of the sum  $2 \times 2 = 4$ . In itself, it means nothing; you're not experiencing anything from that calculation. But with ultramedia, you can assign a visual shape to the various numbers. So  $2 \times 2 = 4$  will produce a different shape to  $3 \times 3 = 9$ . Or, on a higher level, you can show the progression of a number as it goes through a formula. What happens if you look up, say, the cosine of a number in a table? Nothing, you just get an answer and that's that. But ultramedia will help show you *why* you're getting that answer. I'm not saying there's any practical application for this. It's simply another way of viewing and interpreting information.”

For the future, GBM has no particular direction. He'll go where the technology leads. Whether he ends up creating interactive CDs, videos, or books, it's all the same to him. The bottom line is communication. “I'm enjoying being able to play with all these hi-tech toys and create some interesting work without having to produce a business plan. If they ever put a blue plaque on my wall to describe my life and what I did, I'd just like it to read: ‘Graham Brown-Martin: Thinker’.” ■



# Cosmic cases

Are these Pentium II 300MHz machines faster than the speed of light? Well, not quite, but Nik Rawlinson caught up with nine and put them to the test for those with deep pockets.

**P**rocessor speeds continue to climb and this month *PCW* reaches for the outer limits with nine 300MHz Pentium II machines. We opted for 64Mb RAM, full multimedia, a generous hard drive of at least 4Gb and an AGP graphics card. We chose 17in monitors to strike a balance between ease of use and preserving some space on our desks — downsizing often attracts a small reduction in price). Nevertheless, we found that many manufacturers supplied a 19in model as standard.

This group test differs to others we've done: all the machines were to be linked to the *PCW* network to test their compatibility and to see whether the suppliers had configured them or left it for us to do the work. Although our specification was designed mainly to attract workstation PCs, many of the machines submitted could, with very little adaptation, have performed more than competently as a server, making them sensible first purchases for businesses planning a network in the long term.

While bundled software, modems, high-spec graphics and sound cards were a bonus, the environment in which the PCs would be used meant that these bundles were not a main consideration in our final choice of the best machines.

At this level of PC, there is the potential to improve systems: many manufacturers offered us the opportunity to mount two Pentium II processors on the motherboard, effectively doubling the processing muscle. A wide range of hard-drive sizes, memory configurations and free slots and bays made each seem

superior to the rest when considered in isolation, but we were more interested in a rounded picture of how these impressive components would work together, than a demonstration of what high-end processors could do to a mid-range PC.

Finally, in selecting a stable operating system like Windows NT 4.0 with its superior networking facilities, our systems were complete and we could get down to the serious business of testing.

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- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended

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## Atlantic Proteus

**O**pening this machine revealed that the internal speaker and cooling fan were detached from the case and sliding freely around inside, thereby dramatically reducing the effectiveness of the fan and presenting the added risk of the magnetic speaker coming into contact with other internal components. The keyboard, supplied with wrist-rest, failed to inspire sessions of extended use.

Microsoft Office, Works and Money were bundled along with CorelDraw 4, Simply Speaking, World Book and a selection of shareware products.

Although most of this was pre-installed, the Microsoft products were not.

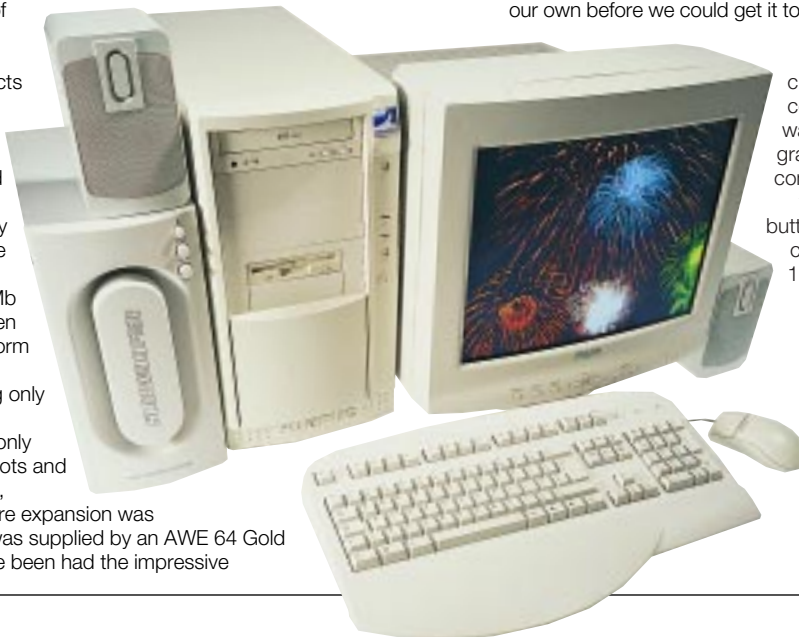
Getting your hands on the processor would mean removing the power supply unit and we were disappointed to see that the 64Mb memory had been supplied in the form of two 32Mb modules, leaving only one slot free for upgrades. With only two spare PCI slots and no free ISA slots, potential for future expansion was limited. Sound was supplied by an AWE 64 Gold — or would have been had the impressive

speakers been compatible: they had jack connectors instead of phono plugs. But these came in handy for identifying the strange buzzy feeling you got when you touched the case: touching the jack to the metal back plate caused the speakers to crackle with electricity! The accompanying joystick was a nice touch but unlikely to be of use on a machine running Windows NT which is not particularly suited to playing games.

Windows NT asked us to re-seat the installed network card or move it to a different slot before it would proceed with the network installation. When this didn't work, we were forced to install a card of our own before we could get it to talk to the PCW network.

**Monitor** The Taxan monitor was clear, sharp and steady, providing a comfortable, flicker-free image, and was driven by an ATI XPERT@work graphics card with 4Mb RAM. All menu commands

were controlled by an intuitive set of buttons on the front panel, and it was capable of a maximum non-interlaced 1,024 x 768 refresh rate of 107MHz.



### PCW Details

**Price** £2,231.33 (£1,899 ex VAT)  
**Contact** Atlantic 0990 134725  
[www.atlanticsystems.com/sys/](http://www.atlanticsystems.com/sys/)  
**Good Points** Excellent monitor.  
**Bad Points** Sloppy construction.  
**Conclusion** Poorly thought out. Disappointing.



## Carrera Technology Power Pro II-300

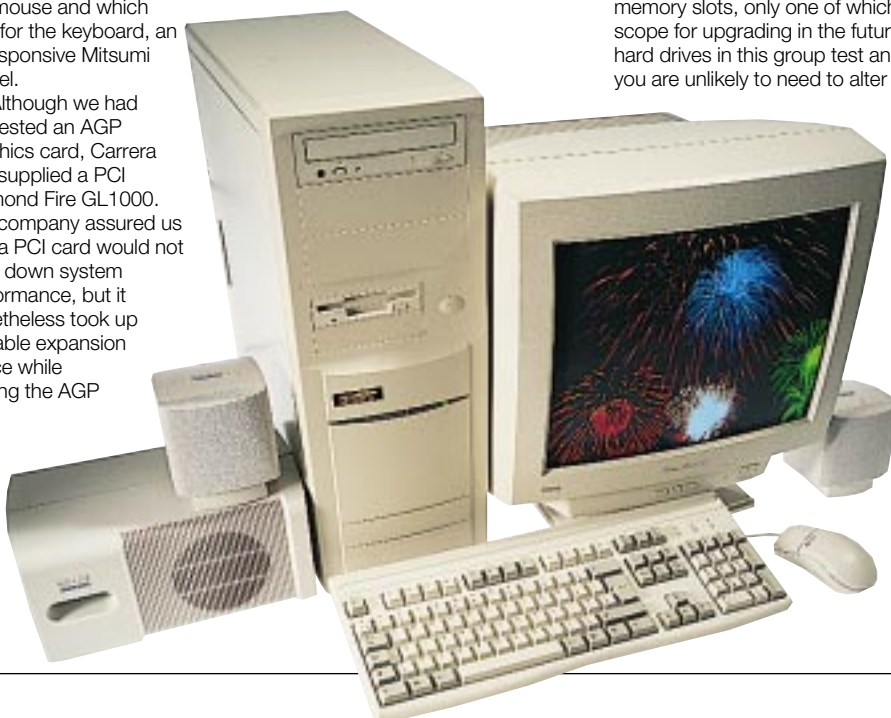
**T**he well laid-out interior of this large tower machine was fairly full with only two free expansion slots, one PCI and one shared. The dual-processor motherboard had only one processor installed to meet our specification but it gave us the opportunity to upgrade in the future. The back plate of the PC was not labelled, causing some confusion as to which PS/2 port was for the mouse and which was for the keyboard, an unresponsive Mitsumi model.

Although we had requested an AGP graphics card, Carrera had supplied a PCI Diamond Fire GL1000. The company assured us that a PCI card would not slow down system performance, but it nonetheless took up valuable expansion space while leaving the AGP

slot vacant. Sound was provided by a SoundBlaster Pro32 and three Altec Lansing speakers which produced rich, clear output at a wide range of volumes.

Connecting to the network simply meant installing the relevant protocol from the system disks and providing an IP address. The system was bundled with a copy of Lotus SmartSuite 97 and, with four memory slots, only one of which had been used, offered plenty of scope for upgrading in the future. Nevertheless, with one of the largest hard drives in this group test and its already high spec, this is a system you are unlikely to need to alter or upgrade for quite some time.

**Monitor** The Iiyama Vision Master 17, although not offering as good an image as the Pro 17, nevertheless produced a clear, steady picture. A viewable area of 15.7in and a simple three-button control made this monitor pleasant and easy to use. A non-interlaced 1,024 x 768 refresh rate of 85Hz ensured it was flicker-free and easy on the eyes.



### PCW Details

**Price** £2,579.13 (£2,195 ex VAT)  
**Contact** Carrera 0171 830 0486  
[www.carrera.co.uk](http://www.carrera.co.uk)  
**Good Points** Second processor slot. Free memory slots.  
**Bad Points** Wasted AGP slot. Unlabelled ports.  
**Conclusion** Versatile. Expandable. Worth consideration.



## Dan Dantum II/SE300

**T**he ports on the rear panel of this large tower case were not labelled and although we had PS/2 connections, the manual was for a serial mouse and DIN keyboard connector: it was a matter of guesswork and we got it wrong.

The keyboard was dull and soft and, even though Microsoft Works for Windows 95 was pre-installed on the hard drive, the installation disks and manuals were not included; therefore, hard-drive problems could have meant losing our applications.

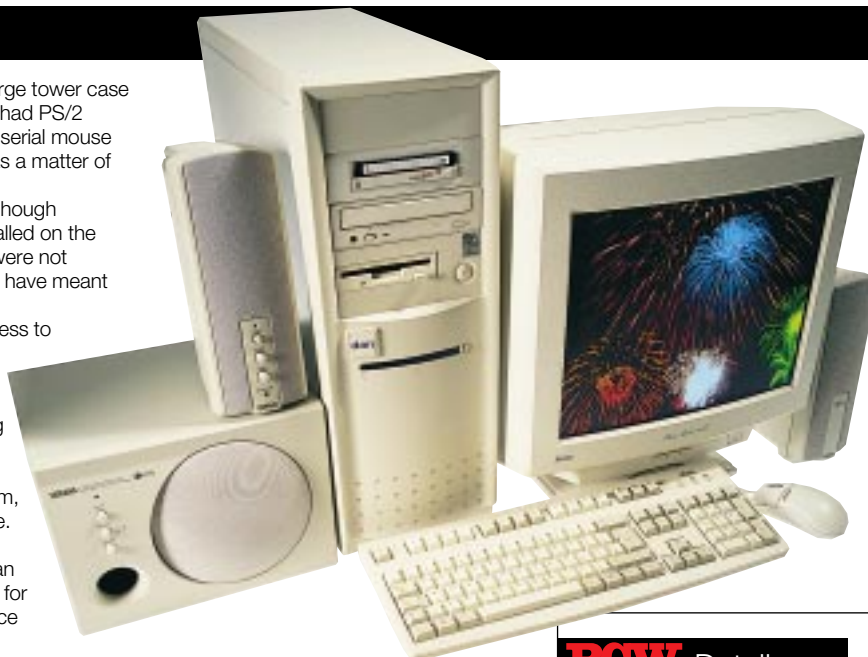
The case interior was tidy, offering easy access to the processor and memory sockets, and connecting to the network was simple. This was merely a matter of installing the TCP/IP drivers from the Windows NT CD and supplying our IP address.

A 28-day trial version of Pipex Dial 4 accompanied the internal 56Kbps Pace modem, as did a copy of SuperVoice and a microphone. A selection of MMX software, including Space Station Simulator, Pod and The Ultimate Human Body was included, but as these are designed for use under Windows 95 we could only get Space Station Simulator to work.

An internal Jaz drive and a 1Mb disk were included, offering the opportunity for easy backups. Sound came from an AWE 64 sound card and a set of YST-M15 powered multimedia speakers from Yamaha with matching woofer.

Apart from the fact that the 64Mb RAM had been supplied on a single module, leaving two further slots free for future expansion, options for upgrading are limited. The absence of any free ISA slots and only two vacant PCI slots left us feeling slightly restricted.

With only a 12-month return-to-base warranty, this system was not as well supported as many in this group we tested.



**Monitor** An excellent Iiyama Vision Master Pro 17. This provided an exceptional display that, driven by a Matrox Millennium II graphics card with 8Mb RAM on-board, was clear and steady throughout our tests. It gave the best display of the bunch.

### PCW Details

**Price** £2,909.30 (£2,476 ex VAT)

**Contact** Dan 0181 830 1100

[www.dan.co.uk](http://www.dan.co.uk)

**Good Points** Monitor, Sound card and speakers. Good benchmark-test results.

**Bad Points** Lack of software install disks. No socket labels.

**Conclusion** Worth consideration if you can afford the high price tag.

★★★

## Dell Dimension XPS-D300

**T**his was the only PC in this group test to arrive in a desktop case. The interior was roomy, and all cabling, although not particularly tidy, was confined to one side of the case.

However, the audio cable connecting the CD drive and sound card was stretched across the two free PCI slots.

Having only one serial port means that options for external connectivity are limited until USB devices become more commonplace and can make use of the Dell's two USB ports. But an internal Iomega Zip drive had been included along with a generous pack of three disks. To get us started, MS Office Small Business Edition had also been bundled and there was a Microsoft Intellimouse.

This was one of the few machines in the group to have a nice keyboard that was comfortable to use throughout our tests. Having specified that these machines were to be used for business applications we had not been expecting cinematic sound, but the Altec Lansing speakers and separate subwoofer



provided sound to rival any games machine, through a SoundBlaster AWE 64 Value Card.

We were disappointed to see that only one of the three memory slots remained free, with the 64Mb RAM being split across two 32Mb SDRAM modules. Expansion options were limited by the desktop, with only one free 5.25in external bay and one free 3.5in internal bay.

The case had a plastic cover which, although pliable, was difficult to remove and it took us several minutes to access the interior. Connecting to the PCW network caused no problems; we simply installed the relevant drivers and supplied our IP address using the 3Com 3C900 card.

**Monitor** The Dell branded monitor was clear, sharp and steady. Driven by an STB Velocity 128 graphics card with 4Mb onboard RAM, its 110Hz maximum refresh rate at a resolution of 1,024 x 768 offered an excellent image that was comfortable to view and use for extended periods.

### PCW Details

**Price** £2,318.28 (£1,973 ex VAT)

**Contact** Dell 01344 720000

[www.dell.com](http://www.dell.com)

**Good Points** Monitor, Sound, Zip drive.

**Bad Points** Case restricts expansion.

**Conclusion** A feature-packed performer.

★★★★

Personal  
Computer  
World  
Highly  
Commended



## Elonex MTX-6300

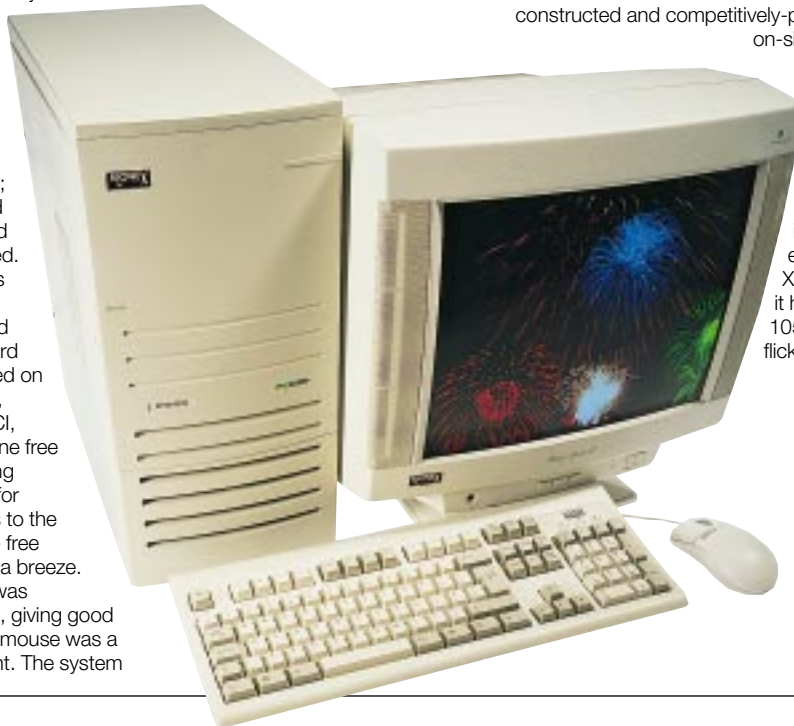
**T**he large, squat case of this PC had a hinged front door hiding eight drive bays: five hot-swappable hard-drive bays, two standard 5.25in bays and a 3.5in bay for a half-height laptop floppy. It was also attractive enough to be displayed proudly on top of the desk. The option of mounting up to five drives in the hot-swappable bays meant that the system could be set up as a RAID array for use as a server. The sides of the case were hinged to allow easy access inside; the screws needed only to be loosened rather than removed.

The interior was the tidiest of any in this test. The sound chips were on-board rather than mounted on an expansion card, leaving two free PCI, one free ISA and one free shared slot, allowing plenty of potential for expansion. Access to the processor and two free memory slots was a breeze.

The keyboard was comfortable to use, giving good feedback, and the mouse was a Microsoft Intellipoint. The system

came bundled with Office 97 Small Business Edition.

Connecting to our network was no problem and no other software needed to be installed. Upon arrival, Windows NT had already been configured with the relevant protocols, so we had to do nothing more than enter our IP address. All in all, this was an impressively-constructed and competitively-priced PC with a one-year on-site warranty.



**Monitor** An Elonex-branded Iiyama Vision Master 17. Its built-in multimedia speakers reduced desk clutter, which we thought to be a particularly sensible idea for a machine intended to be used in a business environment. Driven by an ATI XPERT@work card with 8Mb RAM, it had a maximum refresh rate of 105Hz to deliver a high-resolution, flicker-free image.

### PCW Details

**Price** £2,345 (£1,995 ex VAT)  
**Contact** Elonex 0500 524444  
[www.elonex.co.uk](http://www.elonex.co.uk)  
**Good Points** Loads of room for expansion. Easy case access. Keyboard.  
**Bad Points** None.  
**Conclusion** Well built and well thought out. A very good buy.  
 ★★★★★

## Evesham Vale Platinum PI-300

**T**he compact case made this PC ideal for desktop locations. On arrival, due to a courier's exuberance, the graphics card was slightly mis-seated, preventing the system from booting up until it had been removed and screwed back into place. In the meantime, our attempts to switch on the PC had also reset the BIOS to its default settings, and so the 300MHz processor was instead crawling along at 233MHz. This was easily fixed and the machine excelled in our benchmark tests, benefiting from a speedy hard drive.

An unfortunate internal layout meant that to access the processor would require the removal of the power supply unit. But the overall case design was good, with two free external 5.25in bays plus one internal and one external 3.5in bay. Attractive XY-FI-2 active multimedia speakers capable of a maximum of 64W complemented the AWE 64 Value sound card. The memory was supplied on a single 64Mb SDRAM module, leaving us with two free slots to

increase this in the future; while one free PCI, one free ISA and one free shared slot also offered the opportunity to add further expansion cards at a later date.

Connecting to our network caused no problems using the 3Com Fast EtherLink XL Adapter. Apart from the operating system there was no bundled software, but the power switch had a nice touch: to turn the PC off you must press it for several seconds, during which time an alarm will sound to preclude the accidental loss of work. The two-year on-site warranty with an option to add a further year ensures that your purchase would be well supported.



**Monitor** The Vale came with a 17in Taxan monitor offering a clear, steady, flicker-free image. The lack of excessive reflection or glare made it pleasant to look at for extended periods. Driven by an ATI 3D Rage Pro with 4Mb RAM on-board, it was capable of a maximum refresh rate of 107Hz.

### PCW Details

**Price** £2,936.33 (£2,499 ex VAT)  
**Contact** Evesham 0800 634 5999  
[www.evesham.com](http://www.evesham.com)  
**Good Points** Fastest in this group. Safety power switch.  
**Bad Points** Clumsy interior layout.  
**Conclusion** A machine to suit most business needs.  
 ★★★★★





## Gateway 2000 G6-300

**T**he Gateway's nicely-designed tower case is best resting on the floor. Although we liked the Intellipoint mouse, the keyboard was disappointing, feeling loose and unresponsive. The interior of the machine, while roomy and with plenty of space for expansion, was fairly messy and the ribbon cables made access to the memory slots difficult. We were pleased to see a Conner CTT8000S SCSI tape backup device included, along with a free cartridge offering up to a

massive 8Gb of compressed storage. The memory had wisely been supplied on one DIMM, leaving two sockets free to increase our quota at a later date. The metal case, which we found easy enough to remove, proved to be very stubborn when we tried to replace it due to a slightly bent attachment to the rear of the unit.

Windows NT was pre-installed, yet the CD and manuals supplied were for Windows 95 — a mistake that pointed to poor quality control. Bundling Encarta 97, Money 97 and Microsoft Office 97 Small Business Edition, although not necessary for a high-end workstation, added to its value.

Trying to connect to the PCW network caused problems. An incomplete installation meant that certain drivers were either missing or corrupted and, following several attempts, the only solution was to reinstall Windows NT from scratch. However, it was then merely a matter of entering our IP address and logging on. Sound was supplied courtesy of an Ensoniq AudioPCI sound card, and there were two Boston Acoustic speakers consisting of a large subwoofer and two Rubik's-cube-sized units small enough to find space on even the most cluttered desk.

**Monitor** The monitor had the usual Gateway push-and-twist knob. We had requested a 17in but ended up with a 19in display (hence the higher price). Graphics were fed by an Accel Graphics Permedia 2 card with 8Mb SGRAM on-board offering a maximum 1,024 x 768 resolution refresh rate of 85Hz. Although steady and flicker-free, the image was disappointing and "lined".



### PCW Details

**Price** £3,360.50 (£2,860 ex VAT)  
**Contact** Gateway 2000; 0800 552000  
[www.gateway2000.co.uk](http://www.gateway2000.co.uk)  
**Good Points** Lots of room for expansion. Monitor controls.  
**Bad Points** Wrong manuals. Network problems.  
**Conclusion** A good PC let down by some simple flaws.  
 ★★

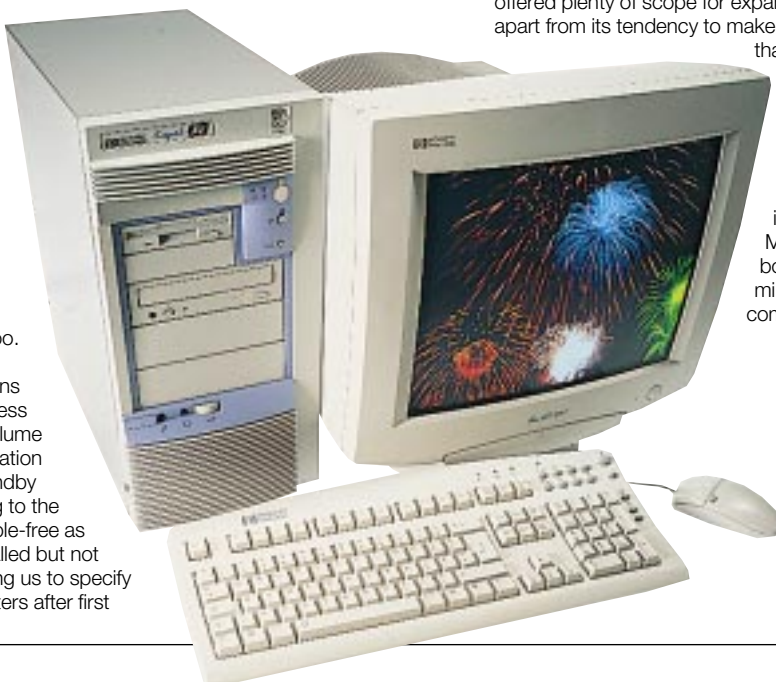
## Hewlett-Packard Kayak XU 6/300

**T**he short, fat case of this PC is two-tone grey with lilac trimmings and easily removed by flipping two catches, without the aid of a screwdriver, to reveal a compact and rather full interior. Accessing the internal components was a struggle. To access either the processor or the memory required the removal of numerous cables, devices and a cooling duct. Removing the case activated the intrusion detector which tells the system to perform a full boot rather than a quick boot on the next startup. Had we not removed this, it would have assumed that the configuration had remained unchanged and fast-booted instead. The keyboard was feature-packed, too. Thirteen user-configurable buttons provide direct access to applications, volume control, PC information and Windows standby mode. Connecting to the network was trouble-free as NT had been installed but not fully set up, allowing us to specify our network adapters after first

switching on. Both Netscape Communicator and Internet Explorer were pre-loaded, with Communicator set as the default browser.

Three free memory slots let us increase allocation to a maximum of 512Mb and a total of four thermostatically controlled fans kept the system cool in extended use. One free PCI, one free ISA and one free shared slot, as well as two free 5.25in and one free 3.5in drive bays, offered plenty of scope for expansion. The only downfall of this PC, apart from its tendency to make us bleed when we fiddled with it, was that, although it had SoundBlaster-compatible 16-bit on-board sound and a headphone/mic combo headset, there were no speakers.

**Monitor** This offered a clear, clean image that was steady and flicker-free in many resolutions. Driven by a Matrox Millennium II AGP card with 4Mb on-board RAM, it offered a picture with a minimum of reflection that was comfortable to use throughout the tests.



Personal  
**Computer  
 World**  
**Highly  
 Commended**

### PCW Details

**Price** £6,440.18 (£5,481 ex VAT)  
**Contact** Hewlett-Packard 0990 474747  
[www.hp.com](http://www.hp.com)  
**Good Points** Compact. Attractive. Feature-packed.  
**Bad Points** Cluttered, but fitting well.  
**Conclusion** A sturdy machine that performed — but it's so expensive!  
 ★★★★★

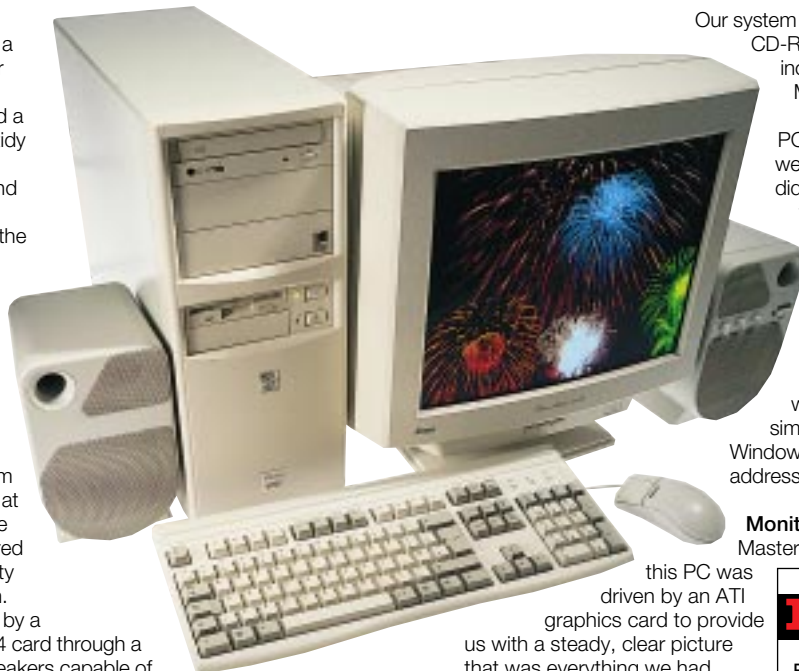
## Mertec Titan VI-300

**T**his PC is housed in a mini-tower case.

Opening it up revealed a well thought out and tidy interior with all cables kept out of the way and clipped onto the case itself. Access to both the memory and the processor was easy, with the motherboard remaining largely unobstructed. The memory had been installed to leave us with two free slots, allowing plenty of room to increase the 64Mb at a later date. Three free PCI and one free shared slot also gave us plenty of room for expansion.

Sound was driven by a SoundBlaster AWE 64 card through a large pair of Enact speakers capable of 14W. But however much we liked the Microsoft mouse, we found the Mitsumi keyboard to be dull with a sluggish, spongy response.

An internal SuperDisk drive and LS120 disk replaced the usual 3.5in drive, giving us the opportunity to read and write up to 120Mb on a floppy-sized medium without filling our spare bays with another drive.



Our system was supplied with a 24-speed CD-ROM drive, and would have included a 32-speed model had Mertec had any in stock.

As we had specified that this PC was to be used on a network, we were not surprised to find that it did not include a modem, but apart from the operating system there was also no bundled software. The explanation we were given for this was that we were expected to run all software from a central file server. When it came to connecting to the PCW network we encountered no problems, simply installing the relevant Windows drivers and supplying our IP address.

**Monitor** The impressive Iiyama Vision Master Pro 17 which accompanied

this PC was driven by an ATI graphics card to provide us with a steady, clear picture that was everything we had expected.

This system would normally be supplied with a 19in Microscan 6P monitor and so, by downsizing in this way, we attracted a small reduction in price.

### PCW Details

**Price** £2,207.83 (£1,879 ex VAT)

**Contact** Mertec Computers  
0181 667 0990 [www.mertec.co.uk](http://www.mertec.co.uk)

**Good Points** Monitor. Tidy interior.

**Bad Points** Keyboard. No extra software.

**Conclusion** A sturdy machine that looks to the future.

★★★

## Glossary

### ■ DRIVES

**Jaz** A high-capacity SCSI drive capable of storing up to 1Gb on a single cartridge in as little as five minutes. Capable of transferring up to 330Mb per minute. Also available for connection to the parallel port at slower speeds.

**LS120** Looking like a floppy drive and capable of reading and writing to standard 3.5in disks, this drive also has the ability to store up to 120Mb on its own-format floppy. IDE interface or connection via the parallel port.

**Zip** 100Mb drives becoming increasingly popular as a means of backing up or transferring large quantities of data at a time. Available as either an internal SCSI or external device running through the parallel port. The internal version is capable of transferring as much as 60Mb per minute to disk.

### ■ EXPANSION

**AGP (Accelerated Graphics Port)** A short expansion slot designed specifically to connect a graphics card, increasing system speed and leaving PCI and ISA slots free. Operates at 133MHz — over twice the speed of the PCI bus.

**ISA (Industry Standard Architecture)** Older expansion technology designed to be used on PCs with a 286 processor. Still widely used, especially for sound cards, but slower and larger than PCI slots.

**PCI (Peripheral Component Interconnect)** Developed by Intel, an interface allowing the connection of many modern expansion cards.

**Shared** Where a PCI and an ISA slot share a common position on the motherboard, effectively screwed into the same cut-out in the case of the PC.

### ■ MISCELLANEOUS

**ATA** See IDE

**ATX** Specification whereby the motherboard has been rotated a quarter turn to allow the connection of full-length expansion cards. This affects the shape of the case, hence references to ATX cases.

**Graphics card** Card designed specifically to handle graphics instructions. The greater the amount of memory on the card, the more colours it will be able to display on-screen at high resolutions.

**IDE (Integrated Drive Electronics)** A protocol allowing the PC and its devices (drives etc) to communicate. Now being replaced by EIDE (Enhanced IDE).

**IP Address (Internet Protocol Address)** Unique number assigned to a computer to allow it to be identified by other computers on a network.

**Pentium II** Successor to the Pentium Pro processor built by Intel. Incorporates multimedia extensions (MMX) running at a speed of 233MHz or higher. Although previous processors had used the so-called Socket 7 connector (a large, square socket), the Pentium II has been designed to fit into "Slot 1" standing upright on the motherboard, which makes upgrading from Socket 7 systems difficult without investing in a new PC.

**RAID (Redundant Arrays of Inexpensive Disks)** A system whereby a number of hard drives are mounted in a single system. An automatic copying procedure ensures minimal or zero data loss should one of the drives fail and need to be replaced.

**Refresh Rate** The number of times that a screen's display is updated each second. Refresh rates above 72Hz (cycles per second) present the human eye with a steady, flicker-free image.

**SDRAM (Synchronous Dynamic Random Access Memory)** Very fast memory running at the same speed as the processor and allowing data to be written and read simultaneously.

**SGRAM (Synchronous Graphics Random Access Memory)** A type of SDRAM with enhancements for handling 3D graphics and video.

**TCP/IP (Transmission Control Protocol/Internet Protocol)** A set of commands used to control how computers communicate over a network.

**USB (Universal Serial Bus)** A new interface which is becoming more common, allowing any number of peripherals to be connected in a chain, overcoming the current restriction of having only one or two serial ports.

**Windows NT** 32-bit version of the Windows operating system offering a more stable environment for networking applications. Version 4 uses the same interface as Windows 95.

**WRAM (Window Random Access Memory)** A fast type of RAM used on graphics cards, including the Matrox Millennium II.

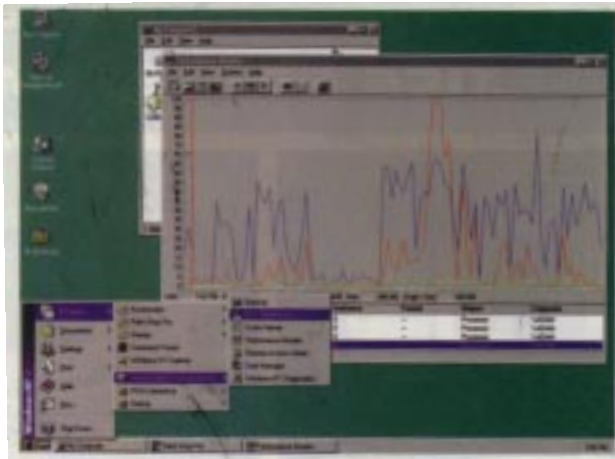
## Windows 95 vs Windows NT

**S**ince its inception, Windows NT has been a secure and stable operating system, but it is only with the launch of NT 4.0 with the Windows 95 interface that it has really taken off. But what makes NT different to 95? Well, although they look similar, there are actually a number of differences.

To begin with, unlike 95, NT controls hardware directly without using the system's BIOS. This is a secure technique but it makes NT particular about hardware. In fact, Microsoft even provides a list of compatible hardware (available from [www.microsoft.com](http://www.microsoft.com)), from PC systems to keyboards, which has been tested with NT 4.0. The fact that an item is not on this list does not necessarily mean it won't work, but if you're thinking about installing NT on an existing system it's vital to check every piece of hardware for compatibility.

You must be sure your hardware is properly configured and has no internal address conflicts: unlike 95, NT does not support plug-and-play, so it cannot automatically detect or change settings. As a result, if something is not set up properly, the system could lock up. NT suffers from poor, or even non-existent, device drivers. In general, graphics cards and scanners are particularly badly served in this department, with NT drivers receiving a lower priority from independent hardware manufacturers than those for Windows 95. One supplier went so far as to say that the graphics driver situation was "abysmal". These problems, together with the perceived complexity of Windows NT, mean that for the time being it is pinned down in the corporate environment with little chance of taking over the average home PC.

But let's not get carried away. NT 4.0 is a powerful, secure, stable operating system which operates very successfully in a business environment. It supports multi-processor systems, although opinion is divided over how well it handles the extra processing power, and it deals with internal and network administration far more effectively than Windows 95. One of the more obvious differences is the selection of administrative tools available on the NT Programs



**The Administrative Tools in Windows NT allow you to monitor the performance of your system**

menu. The specialised Backup facility lets you save important information to your local tape drive, and the Performance Monitor enables you to monitor the performance of all computers on your network. Disk Administrator allows you to view and configure the partitions on your hard drive, dispensing with the need for third-party applications when running Win95. User Manager lets you manage security for a network of NT computers, creating accounts and user rights. Event Viewer keeps track of significant occurrences in a program, or in the system, of which you need to be aware. Windows NT Diagnostics displays information about your computer's resources, while Task Manager gives you a simple graph of the processor time taken by each open application and allows you to monitor process status. The File System is the method used for storing and managing data on your hard drive and performs three main functions:

1. Tracking free and used space.
2. Tracking the physical locations of files.
3. Remembering directory structures and filenames.

There is a huge number of different file systems used throughout the computing world but the most common, used by Microsoft operating systems, are FAT, FAT32 and NTFS. The most recent releases of Windows 95 can use FAT and FAT32, while NT 4.0 recognises FAT (File Allocation Table) and NTFS (New Technology File System). FAT is an old and faithful campaigner, having been around since DOS was the only operating system in town, and supports a maximum disk size of 2Gb. Nowadays this is not particularly big, but when FAT was designed, the thought of such a huge hard disk was almost ridiculous. Because of this limitation, larger disks have to be split into two or more sections, called partitions, so that FAT can access them. FAT32 is an enhancement to the standard FAT file system and uses a 32-bit system which both allows you to use disks of up to two terabytes in size, and makes more efficient use of the available space.

NTFS is a very secure file system which, because of the space it uses, is not recommended for disks under 400Mb. It works well on large drives, though, because of the efficient way in which it handles files. There may be a performance issue involved in the choice of FAT or NTFS under NT 4.0, with some PC manufacturers claiming that FAT gives better performance, albeit at the cost of reduced security.

As far as hardware is concerned, there is a good argument for choosing SCSI over EIDE because of the vastly superior way in which it handles multitasking. In six months' time the debate may be Windows 98 vs Windows NT 5.0. It is well known that Microsoft is moving towards one operating system for both home and office and that this will come from



**The NT 5.0 interface is likely to be similar to Windows 98**

the NT side of the family within a few years. It will take a while but there are definite signs of convergence. Many games software houses are already developing their products for both operating systems in the knowledge that an increasing number of people are choosing NT for their home PCs. Independent hardware manufacturers are also realising that the NT 4.0 user base is growing and are placing more of a priority on providing decent drivers, but this should not be an issue with NT 5.0. Windows 98 and NT 5.0 will have Common Device Drivers, meaning that the same hardware drivers can be used for both operating systems. NT 5.0 will support 64-bit data, in line with Intel's future "Merced" range of processors, and the interface will probably follow Windows 98 and Internet Explorer 4.0 into the realm of the internet-enabled desktop. The days of a unified Microsoft operating system are not here, but the prospect is getting ever closer.

**Adam Evans**

Editor's Choice

**A**lthough speed should play some part in deciding which PC in this group deserves to be awarded our Editor's Choice, when running Pentium II processors at 300MHz the difference to the end-user will be negligible. Other factors, such as the quality of the monitor, the price of the system and the opportunities for expansion, should play a more important role than usual when comparing PCs of this specification. Many systems we tested exceeded our hopes, with high-quality sound cards, impressive speakers and graphics cards that would not only cope admirably with everything a business graphics package could throw at them, but also hold their own against many dedicated gaming machines.

Having said that, the first of our three **Highly Commended** awards goes to the PC which performed fastest in our benchmark tests: the **Evesham Vale Platinum PI-300**. This compact machine had nice features, not least of which are the accident-averting power switch and the two-year on-site maintenance warranty. Evesham had been prudent in restricting the memory to one DIMM, and although one of the more expensive PCs in the group, it still clocked in at below the £3,000 mark. We also **Highly Commend Dell's Dimension XPS-D300**. It performed well in tests and the keyboard, mouse and monitor were all of excellent quality. Without cutting corners, Dell managed to keep its price highly competitive and within the reach of many smaller businesses which may want to invest in a quality workhorse built to last.

Our third and final **Highly Commended** award in this group test goes to **Hewlett-Packard**, which would otherwise have been our Editor's Choice had its price not eclipsed the other contenders. The **Kayak XU 6/300** was sturdily built with an innovative and attractive case packed with features and extras that are unique in its league. It performed well in our benchmark test, appearing in the top three for speed, and the high-quality monitor and user-friendly keyboard made it a joy to use.



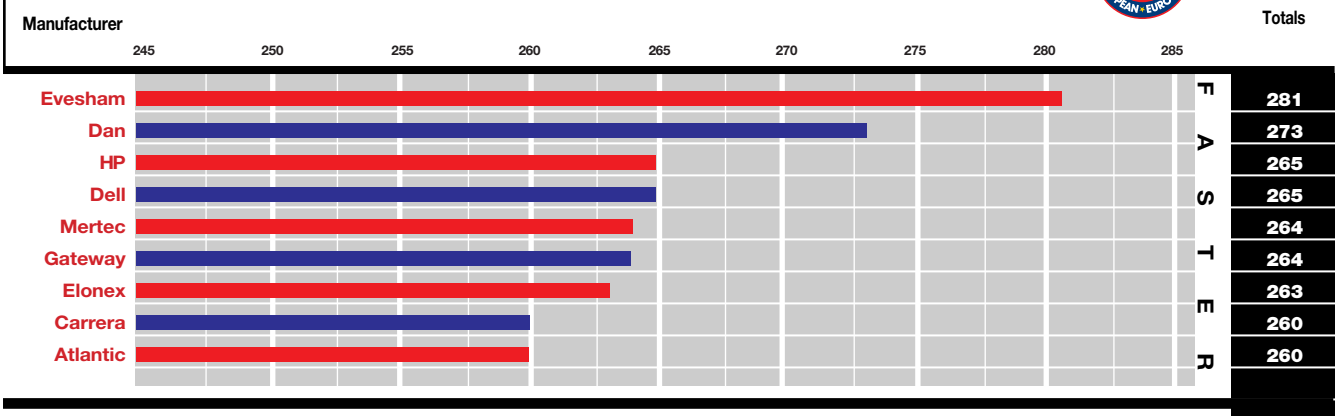
The **Elonex MTX-6300**

On a features-to-price ratio, though, the **Elonex MTX-6300** wins hands down and it is for that reason we make it our **Editor's Choice**. It outshone its competitors on expansion opportunities alone and it was the only system to offer hot-swappable drive bays. The Iiyama Vision Master multimedia monitor combined high quality with practicality, reducing desk clutter by doing away with the need for external speakers, and the whole system was well thought out, offering easy access to its carefully-planned interior.

This PC would perform admirably in the role of either a workstation or, with a few additions, a server, making it the ideal purchase for those who want a system that will grow with their needs.

Nik Rawlinson

Performance Results



How we did the tests

Choosing which tests to run on the NT 4.0 workstations was difficult. As always, they had to reflect real-world use, but as the machines span such an enormous price range, picking a typical use wasn't easy. The test we use is the official BAPCo (Business Application Performance Corporation) test for NT 4.0 which is supported by a wide cross-section of the computer industry, including Compaq, Dell, Digital, IBM, Intel, Lotus and Microsoft.

It is based on the time taken to perform common tasks on the following packages: Word 6.0, Excel 5.0, Texim Project 2.0e, Orcad Layout 7.0 and PowerPoint 4.0. These are all full 32-bit versions which run natively on all architectures, except for PowerPoint which is 16-bit and runs under NT emulation. The BAPCo test is an extremely good indicator of the power of a PC under these conditions, although it does have a couple of limitations. As the applications themselves do not directly support multi-processor systems, the test results only show

improvement resulting from NT's own utilisation of the extra available power. Also, the test can place very high-end machines, intended for such things as animation and rendering, at a disadvantage because the expensive specialist 3D graphics cards in these workstations have inferior 2D performance compared with cards like the Matrox Millennium. These limitations would not normally be a problem, but are something we had to consider in our assessment because this group test covers such an extensive variety of PCs.

But the BAPCo results are not the final word on the selection of a winner. On one hand, the test produces a result for sheer system performance but it doesn't take into account issues like build quality, customer service and price. That is why you will see that the fastest PC doesn't always win our group tests. On the other hand, speed is not something we wholeheartedly discount, and that is why it's always a point worth mentioning.












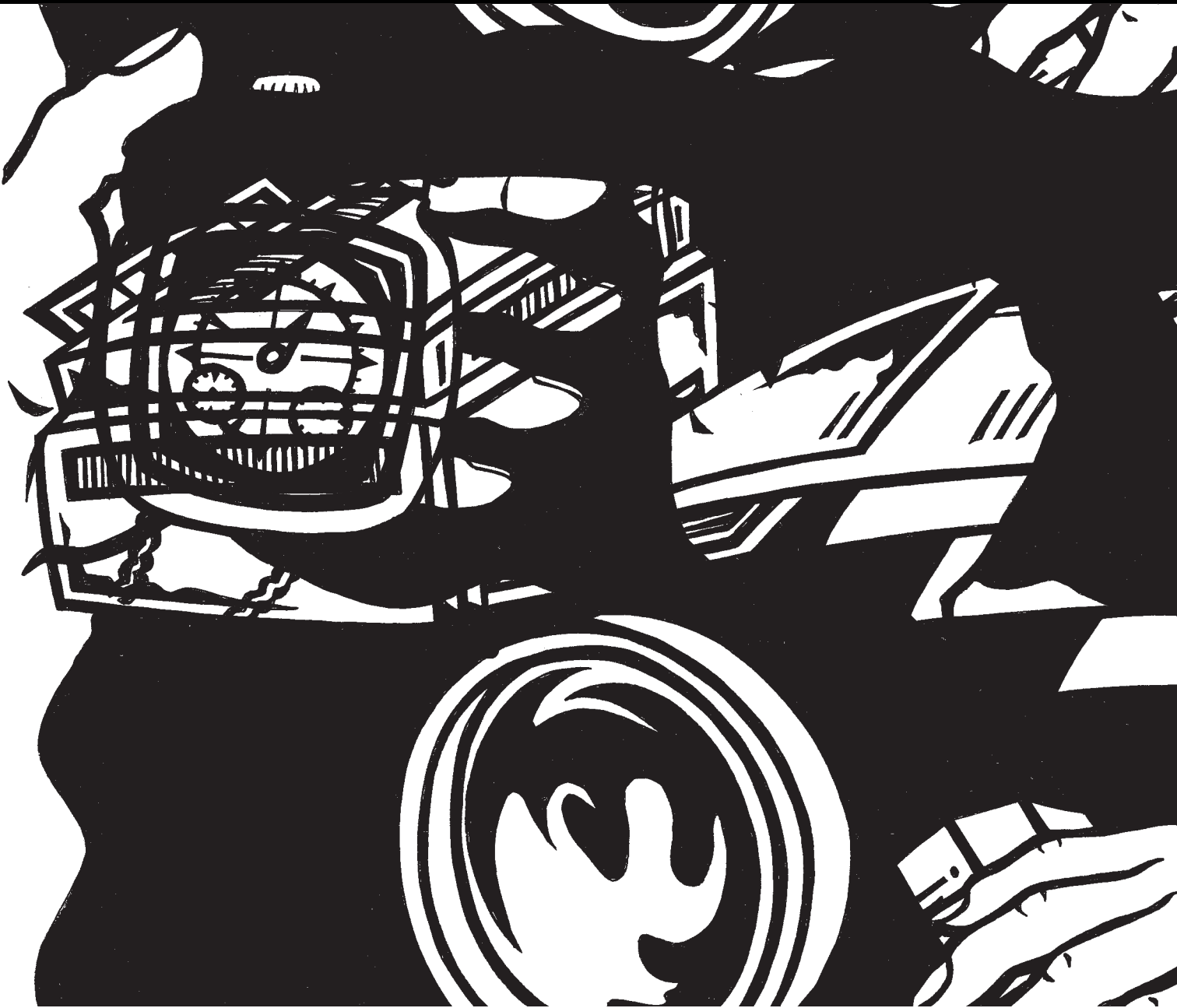
Table of Features					
				 <b>Personal Computer World</b> <b>Highly Commended</b>	 <b>Personal Computer World</b> <b>Editor's Choice</b>
<b>Manufacturer</b>	<b>Atlantic Systems</b>	<b>Carrera</b>	<b>Dan</b>	<b>Dell</b>	<b>Elonex</b>
<b>Model Name</b>	<b>Proteus</b>	<b>Power Pro II-300</b>	<b>Dantum II / SE300</b>	<b>Dimension XPSP300</b>	<b>MTX-6300/I</b>
Price (ex VAT)	£1,899	£2,195	£2,476	£1,973	£1,995
Price (inc VAT)	£2,231.33	£2,579.13	£2,909.30	£2,318.28	£2,344.13
Telephone	0990 134725	0171 830 0486	0181 830 1100	01344 720000	0500 524444
Fax	01639 821300	0171 299 6600	0181 830 1122	N/A	0181 452 7444
Web address	<a href="http://www.atlanticsystems.com/sys/">www.atlanticsystems.com/sys/</a>	<a href="http://www.carrera.co.uk">www.carrera.co.uk</a>	<a href="http://www.dan.co.uk">www.dan.co.uk</a>	<a href="http://www.dell.com">www.dell.com</a>	<a href="http://www.elonex.co.uk">www.elonex.co.uk</a>
Standard warranty	1-yr on-site, 4-yr RTB	1-yr parts, 3-yr lab RTB	1-yr RTB	1-yr collect and return	1-yr on-site
Warranty options	3-yr on-site, 4-yr RTB	on-site + extension	on-site	3 years on-site	extendable
Technical support	9-5 Mon-Fri	9-6 Mon-Fri, 10-5 Sat	9.30-6 Mon-Fri	8-8 Mon-Fri	8.30-6 Mon-Fri / 9-1 Sat
<b>Hardware spec</b>					
Processor	Intel Pentium II - 300	Intel Pentium II - 300	Intel Pentium II - 300	Intel Pentium II - 300	Intel Pentium II - 300
RAM/type/No. of pins	64Mb/DIMM/168	64Mb/SDRAM/168	64Mb/SDRAM/168	64Mb/SDRAM/168	64Mb/SDRAM/168
Hard disk	Quantum ST	IBM Deskstar 8	IBM DHEA	IBM Darkstar 5	Fujitsu MPA 1064
Size(Gb)/Access time (ms)/interface	6.5Gb/9.5ms/ EIDE/UDMA	8.4Gb/5.6ms/ EIDE/UDMA	6.4Gb/9.5ms/ EIDE	6.4Gb/9.5ms/ ATA-33	6.4Gb/9ms/EIDE UDMA / 33 Ultra ATA
<b>Motherboard components</b>					
Manufacturer	Intel	Intel	Austek	Intel	Intel
Model/chipset	ATX/AL-440LX	ATX/Intel Dual 440LX	ATX/Intel 440LX	ATX/Intel 440LX	AL440LX/Intel 440LX
L2 cache/Max cache (Kb)	512/512	512/512	512/512	512/512	512/512
<b>Expansion and I/O</b>					
Spare bays (3.5in/5.25in)	1 x 3.5in/1 x 5.25in	1 x 3.5in/1 x 5.25in	1 x 3.5in/2 x 5.25in	1 x 3.5in/1 x 5.25in	4 x 3.5in/1 x 5.25in
AGP slot	1	1	1	1	1
PCI slots/ISA slots/shared	4PCI / 3ISA / 1 shared	3PCI / 2ISA / 1 shared	5PCI / 2ISA / 0 shared	3PCI / 1ISA / 1 shared	2PCI / ISA / 1 shared
USB/serial/parallel/PS2	2USB/2S/1P/2PS2	2USB/2S/1P/2PS2	2USB/2S/1P/2PS2	2USB/1S/1P/2PS2	2USB/2S/1P/1PS2
<b>Multimedia</b>					
CD-ROM man./model	Goldstar	Panasonic CR-585B	Panasonic CR-585	Toshiba XM6102B	Panasonic CR-585-V
CD-ROM speed/interface	24x/EIDE	24x/EIDE	24x/EIDE	12/24x/EIDE	24x/EIDE
Sound card manufacturer	Creative Labs	Creative Labs	Creative Labs	Creative Labs	Creative Labs
Sound card model	AWE 64 Gold	Pro 32	AWE64	AWE64	Vibra 16 (onboard)
Speakers	500W	Altec Lansing AC545	Dan Hi-Fi	Altec Lansing ACS290	In monitor
<b>Graphics and monitor</b>					
Graphics card	ATI AGP Rage Pro3D	Diamond Fire GL1000	Matrox Millennium II	STB Velocity 128	ATI Xpert@work
RAM/Max RAM/type	4Mb/16Mb/SGRAM	8Mb/8Mb/SGRAM	8Mb/16Mb/WRAM	4Mb/4Mb/SGRAM	8Mb/8Mb/SGRAM
Monitor model/size	Taxan 750 Ergo/17in	Iiyama 8617T/17in	Iiyama 9017E/17	Dell 1025HS/17	Iiyama Visionmaster/17
Max refresh rate @ 1,024x768 NI	107Hz	107Hz	160Hz	110 Hz	Card:150Hz/Mon:105Hz
<b>Other information</b>					
Modem speed (Kbps)	56Kbps	56 Kbps	56 Kbps	56Kbps	N/A
Modem make	N/A	N/A	Pace Microlin Voice	US Robotics	N/A
Misc. hardware	LS120 drive Intel Ether Pro 100 Network Adapter	Intel Pro 10/100 Network Adapter	Omega Jazz 1Gb 3Com 3C905 Network Adapter	Omega Jazz 1Gb 3Com 3C905 Network Adapter	Internal3Com 3C900 Network Adapter
<b>Extras</b>					
Office suite	MS Office 97	Lotus SmartSuite 97	Lotus SmartSuite 97	MS Office 97 SBE	MS Office 97 SBE
Other software	Win NT 4.0 CorelDraw 4 Desktop Lawyer IBM Simply Speaking Worldbook Enc'pedia	Win NT 4.0	Win NT 4.0 LAN Desk Client MS Works	Win NT 4.0	Windows NT 4.0 MMX Bundle

Table of Features				
	 		 	
<b>Manufacturer</b>	<b>Evesham</b>	<b>Gateway</b>	<b>Hewlett-Packard</b>	<b>Mertec</b>
<b>Model name</b>	<b>Platinum PI-300</b>	<b>G6-300</b>	<b>Kayak XU 6/300</b>	<b>Titan VI-300</b>
Price (ex VAT)	£2,499	£2,860	£5,481	£1,879
Price (inc VAT)	£2,936.33	£3,360.50	£6,440.18	£2,207.83
Telephone	0800 6345999	0800 552000	0990 474747	0181 667 0990
Fax	01386 765500	N/A	0171 735 5565	01792 473887
Web address	<a href="http://www.evesham.com">www.evesham.com</a>	<a href="http://www.gateway2000.co.uk">www.gateway2000.co.uk</a>	<a href="http://www.hp.com">www.hp.com</a>	<a href="http://www.mertec.co.uk">www.mertec.co.uk</a>
Standard warranty	2 years on-site	1-yr on-site, 2-yr RTB	1-yr on-site, 2-yr RTB	5-yr RTB (2-yr P/L, 3-yr L)
Warranty options	3rd year optional	3-yr on-site	3-yr on-site	1-yr on-site
Technical support	9-5.30 Mon-Fri, 9-3 Sat	8-10 Mon-Sat	N/A	9-6 Mon-Fri
<b>Hardware spec</b>				
Processor	Intel Pentium II - 300	Intel Pentium II - 300	Intel Pentium II - 300	Intel Pentium II - 300
RAM/type/No. of pins	64Mb/SDRAM/168	64Mb/SDRAM/168	64Mb/SDRAM/168	64Mb/SDRAM/168
Hard disk	Cheetah	Seagate	Seagate	IBM Deskstar
Size (Gb)/access (ms)/int	4Gb/7.5ms/Ultrawide SCSI	8.4Gb/11ms/Ultra SCSI	2 x 4.5Gb/9.5ms/Ultra ATA	6.4Gb/9.5ms/EIDE UDMA
<b>Motherboard components</b>				
Manufacturer	Chaintech	Intel Pentium II - 300	HP	Austek
Model/chipset	6 LTM/440LX	Astoria/Intel 440 LX	440 LX	ATX/Intel 440 LX
L2 Cache/max cache (Kb)	512/512	512/512	512/512	512/512
<b>Expansion and I/O</b>				
Spare bays (3.5in/5.25in)	2 x 3.5in/2 x 5.25in	2 x 3.5in/2 x 5.25in	3 x 3.5in/2 x 5.25in	1 x 3.5 (1 int)/2 x 5.25in
AGP slot	1	1	1	1
PCI slots/ISA slots/shared	4 PCI/2 ISA/1 shared	3 PCI/1 ISA/1 shared	3 PCI/2 ISA/1 shared	5 PCI/2 ISA/0 shared
USB/serial/parallel/PS2	2 USB/2S/1P/2PS2	2USB/2S/1P/2PS2	2USB/2S/1P/2PS2	2USB/2S/1P/2PS2
<b>Multimedia</b>				
CD-ROM manufacturer/model	Panasonic CR-585	Plextor	Matsushita	Toshiba XM6102B
CD-ROM speed/interface	24x / EIDE	12x / SCSI	24x / EIDE	24x / EIDE
Sound card manufacturer	Creative Labs	Ensoniq	Creative Labs	Creative Labs
Sound card model	AWE 64 Value	AudioPCI Wavetable	SoundBlaster 16	AWE 64
Speakers	ZYFI	Boston Acoustics	None	Enact 120
<b>Graphics and monitor</b>				
Graphics card	ATI 3D Rage Pro	Accelgraphic Permedia2	Matrox Millennium II	ATI Xpert@Work AGP
RAM/Max RAM/type	4Mb/8Mb/SGRAM	8Mb/8Mb/SGRAM	4Mb/16Mb/WRAM	8Mb/8Mb/SGRAM
Monitor model/size	Taxan 750/17in	EV900/19in	HP1280 UltraVGA/17in	Iiyama V'Master Pro/17in
Max refresh rate @ 1,024 x 768 NI	107Hz	85Hz	68.7Hz	85Hz
<b>Other information</b>				
Modem speed (Kbps)	56	N/A	N/A	N/A
Modem make	N/A	N/A	N/A	N/A
Misc hardware	3Com 905TX 10/100 Network Adapter	TR4 Tape Backup10/100 Network Adapter	N/A	120Mb Super Disk 3Com 3C905 XL Network Adapter
<b>Extras</b>				
Office suite	N/A	MS Office 97 SBE	None	N/A
Other software	Windows NT 4.0	Windows NT 4.0	Windows NT 4.0 Adobe Acrobat Netscape Navigator MS Internet Explorer	Windows NT 4.0 Landesk Client Manager





# Dirty dozen

The laser printer is becoming increasingly affordable and more manageable — we can all do with better output quality and less toner spill. Adam Evans puts twelve to the test.

**M**any people don't like laser printers. They say that compared to inkjets, they are expensive and dull: why print in boring old black and white when you can have glorious all-singing all-dancing colour? But these people are only looking at half the picture. Laser printers have several advantages over the cheaper inkjets. They are cheaper to run and provide considerably better quality output. The ink on the page is dry as soon as it comes out of the printer, so there is none of that blowing on the paper whenever you print an image that uses a lot of black. The paper handling on laser printers is often superior to that of inkjets, with manual inputs and straight paper paths for taking non-standard media. And last, but certainly not least, they're fast. Ten of the twelve printers tested here claim speeds of six pages per minute, with one boasting a staggering eight pages per minute. When you consider these advantages, you start to realise that laser printers may not be so expensive after all. The models reviewed here range from £165 to £299 and demonstrate that a budget laser is certainly not a contradiction in terms. In fact, having one for personal use could be a pretty good idea.

Even though, at first glance, most laser printers seem the same, beneath the surface they can be very different indeed. The features offered by the manufacturers vary considerably and often there is little correlation between functionality and price. We have put each printer in this group through a rigorous testing procedure, checking speed, image quality (including halftones, fine lines, text, solid blacks and white-on-black) and the accuracy of the paper-handling process. The winners and losers in this round-up are judged on these three criteria together with value for money, features and usability.

## Laser Printers Contents

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- 187 Epson EPL-5500
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- 192 Oki OKOIPAGE 6ex
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### Brother HL-730 Plus

**T**he HL-730 Plus has a large, flat design that demands considerable desk space. The massive 100-sheet output tray takes up nearly as much space as the printer itself. The standard paper path is almost straight, making printing on non-standard media considerably easier. Installation is easy: the drum slots straight in and ejects a small plastic sheet as confirmation. The software is similarly easy to set up and provides excellent bi-directional information about printer status. There's an impressive number of features, including native printing from DOS, Level 4 PCL emulation and an optional serial interface. The input paper tray holds a whopping 200 sheets as standard. The life expectancy of a toner cartridge is 2,200 pages at



five percent coverage, although the starter cartridge supplied with new machines can only manage 1,000. The test results are disappointing. The Plus's second-to-last place in the quality test stems from greyish solid blacks, poor halftones and noticeable banding. On the positive side, the graphical images were fairly impressive. The speed test shows the HL-730 Plus to be a decent performer, nestling comfortably in the middle of the pack.

#### PCW Details

**Street Price** £233.83 (£199 ex VAT)

**Contact** Brother 0161 330 6531  
[www.brother.com](http://www.brother.com)

**Good Points** Lots of features. Good graphical output. 1Mb memory.

**Bad Points** Huge footprint. Slowish First Sheet Out Time (FSOT).

**Conclusion** Great value, but only if you need all the features.

★★★

### Canon LBP-660

**D**espite the fact that the LBP-660 is one of the cheapest printers in the group, we were impressed by the overall build quality. It feels extremely sturdy, making up for the fact that the design is quite dull. Having said this, there is one clever design ploy by Canon: two different-shaped extensions to the output tray support which snap on easily and make using long or heavy paper a breeze. Setting up is simplicity itself with the aid of the excellent *Getting Started* card. The software is similarly easy to install, which is just as well, since the printer relies on it completely. There are no buttons or indicators on the LBP-660 — all the messages from the printer are routed to the PC via the bi-directional parallel interface. We used this system with some trepidation at first, but were eventually impressed by its capabilities.

In addition to the standard 100-sheet input tray there



is a manual input with guides. Handling awkward media is made considerably easier with the straight paper path feature, toggled on or off by a cleverly-designed switch on the front of the printer. The speed-test result shows that the Canon LBP-660 is a nippy little number with a particularly impressive First Sheet Out Time (FSOT) of 23 seconds. The quality score is not so spectacular, with poor solid blacks and halftones letting the side down. However, the text and graphics output is considerably better.

#### PCW Details

**Street Price** £216.20 (£184 ex VAT)

**Contact** Canon 0500 550111  
[www.canon.co.uk](http://www.canon.co.uk)

**Good Points** Great build quality. Cheap. Quick.

**Bad Points** Only 256Kb memory. No native DOS printing.

**Conclusion** A great budget printer.

★★★★

### Epson EPL-5500

**T**he Epson EPL-5500 is one of a trio of lookalikes in this group test. It's difficult to tell it apart from the Minolta and Lexmark models with the naked eye, but there are a host of differences under the bonnet. The Epson is the most difficult printer to set up out of all the machines tested, because of the poor manual. All the information is there, but the presentation is unclear and the diagrams are unhelpful. On the software side, installing the drivers is a whole lot easier. The Epson has quite a small footprint, although this does increase with the input and output trays extended. The trays do feel a little flimsy but the rest of the construction seems solid enough. The EPL-5500 comes with 1Mb memory as standard, upgradeable to a massive 32Mb. A PostScript version of the printer, with 5Mb memory, is available for around £630. The paper input tray



can accommodate a healthy 150 sheets with output capacity for 100 sheets. A secondary tray is available which brings the total input to 400 sheets, more than enough for any non-workgroup printer. The test results are interesting. The Epson EPL-5500 came out joint third with the Minolta in the image-quality tests, with particularly impressive solid blacks. However, it let itself down in the speed test: 36 seconds for the first page and a horrific 158 seconds for the job to complete. This must be something to do with the drivers, as the Minolta and Lexmark printers, using similar hardware, do a far better job.

#### PCW Details

**Street Price** £321.95 (£274 ex VAT)

**Contact** Epson 01442 261144  
[www.epson.co.uk](http://www.epson.co.uk)

**Good Points** Great-quality output.

**Bad Points** Slow. No straight paper path.

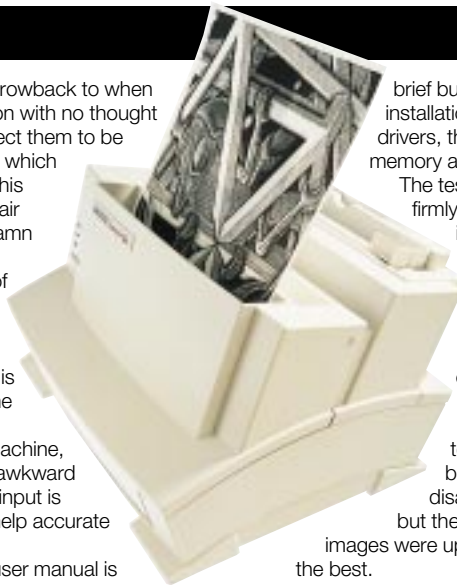
**Conclusion** It could have been a contender, but it's just too slow.

★★★

### Hewlett-Packard LaserJet 6L

**T**he LaserJet 6L looks like a throwback to when printers were all about function with no thought for form. These days we expect them to be sleek, smooth machines with which you can impress your friends. But does this really matter? The 6L may have taken a fair whack with the ugly stick but it's still a damn good printer. The design is similar to the Canon: a largish footprint that, in terms of workspace, is rescued by the use of near-vertical input and output paper trays. Each tray can hold 100 sheets. Another design similarity with the Canon is the clever toggle switch on the front of the machine, which enables you to eject the paper through a slot in the base of the machine, giving a straight paper path for use with awkward non-standard media. The manual paper input is also well designed, with guide levers to help accurate sheet feeding.

Setting up posed no problems. The user manual is



brief but provides all the essential information, from installation to troubleshooting. In addition to the Windows drivers, the Epson features native DOS printing and has 1Mb memory as standard, upgradeable to 8Mb.

The test results are fairly unexciting. The LaserJet 6L is firmly wedged in the middle of the bunch for both

image quality and speed, although, at 25 seconds, the time for the first page out was encouraging. In the quality test, the solid blacks were disappointing but the graphic images were up there with the best.

#### PCW Details

**Street Price** £272.60 (£232 ex VAT)

**Contact** Hewlett-Packard  
0990 474747 [www.hp.com](http://www.hp.com)

**Good Points** Reasonably priced. Straight paper path.

**Bad Points** Only average performance.

**Conclusion** Certainly worth considering.

★★★

### Kyocera FS-600

**C**hunky-looking and with a largish footprint, the FS-600 feels solid, although the flip-up guide on the paper output tray is a little flimsy. Setting up the printer and software is easy enough: the manual gives clear instructions that cover the entire procedure. Interestingly, Kyocera is one of only two companies in this group to provide the software on a CD. The input tray has a capacity of 150 sheets and there is a manual input that takes one sheet at a time. The manual feed features one of the most interesting designs we have seen: pull out the main input tray a short distance and then flip up a little platform which has guides for various paper sizes. The main output tray can hold an impressive 150 sheets. The standard memory is 2Mb expandable to a gargantuan 34Mb, which is excellent for a printer at this price. The downside is the



lack of native DOS printing, though this is a drawback that applies to fewer users as time marches on. Here at PCW, we seldom find ourselves printing straight from DOS, although we appreciate that some users do need this facility. The FS-600 comes out top in the

image-quality test with a score of 56.48 percent. The solid blacks, greyscales and graphic images are particularly impressive. Unfortunately, the speed-test results are nowhere near as exciting, with a whopping 38-second wait for the first page to emerge.

Personal  
**Computer  
World**  
**Highly  
Commended**

#### PCW Details

**Street Price** £280.83 (£239 ex VAT)

**Contact** Kyocera 01734 311500  
[www.kyocera.co.uk](http://www.kyocera.co.uk)

**Good Points** Great image quality. Reasonably priced.

**Bad Points** Slow. No native DOS printing.

**Conclusion** If image quality is all you care about, this is the one.

★★★★

### Lexmark Optra E+

**T**he Lexmark Optra E+ has quite a small footprint, although this increases with the input and output trays extended. As with the Epson, the trays feel a little flimsy but the rest of the construction seems solid enough. Lexmark has recognised the slight problem with the trays and provides two plastic feet for the paper input tray, which increase stability. Setting up is simple enough but the process of installing the software drivers seems needlessly complicated.

The Optra E+ comes with 2Mb memory as standard, upgradeable to 5Mb. The paper input tray can accommodate 150 sheets with output capacity for 100 sheets. A secondary tray is available, bringing the total input to 400 sheets. Native DOS printing is



supported and Lexmark provides 5e PCL emulation.

The test results show that the Lexmark Optra E+ is one of the better printers here. Its image-quality score is beaten only by the Kyocera and we were especially pleased with the text, solid blacks and grey-scales. On the downside, the quality of the graphic images was not

quite as good as some of the other printers. The overall time for the speed test was 124 seconds, placing the Optra E+ in a very respectable fourth position. However, the time recorded for the first page out, at 28 seconds, was rather long.

#### PCW Details

**Street Price** £351.33 (£299 ex VAT)

**Contact** Lexmark 01628 481500  
[www.lexmark.co.uk](http://www.lexmark.co.uk)

**Good Points** Great quality and a decent turn of speed.

**Bad Points** Pricey. No straight paper path.

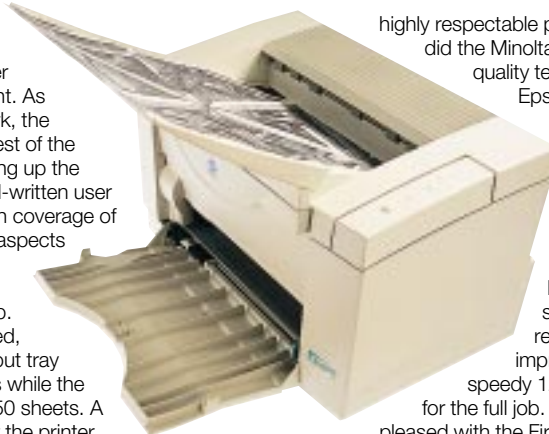
**Conclusion** A very good all-rounder.

★★★★

**Personal Computer World**  
**Highly Commended**

### Minolta PagePro 6

**T**he Minolta PagePro 6 is a good-looking printer with a small footprint. As with the Epson and the Lexmark, the trays feel a little flimsy but the rest of the machine seems well built. Setting up the printer is made easy by the well-written user manual which provides in-depth coverage of the software and the technical aspects of the machine. The Minolta boasts 2Mb memory as standard, upgradeable to 18Mb. Native DOS printing is supported, as is 5e PCL emulation. The input tray holds a respectable 150 sheets while the output tray has a capacity of 150 sheets. A secondary tray which fits under the printer, with no increase to the footprint, is available, bringing the total input capacity to 400 sheets. A manual-feed mechanism is provided for non-standard media. The Epson and Lexmark printers both turned in



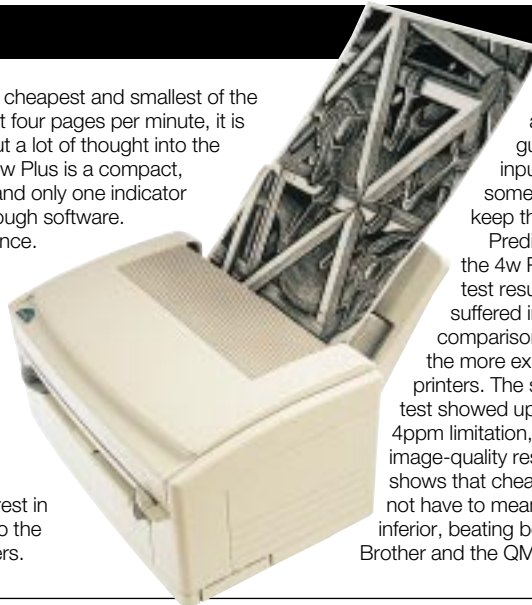
highly respectable performances, so how did the Minolta do? The image-quality test puts it in joint third place with the Epson, both just behind the Lexmark. We were very impressed with the solid black, greyscales, fine lines and graphic images, but the quality of the halftones brings the score down a little. The speed test results are impressive — a speedy 120 seconds for the full job. We were very pleased with the First Sheet Out Time: the Minolta is the second fastest out of the twelve machines, at 22 seconds.

#### PCW Details

**Price** Street £351.33 (£299 ex VAT)  
**Contact** Minolta 01908 200400  
[www.minolta.co.uk](http://www.minolta.co.uk)  
**Good Points** Great image quality. Very quick.  
**Bad Points** Pricey. No straight paper path.  
**Conclusion** An excellent printer.  
 ★★★★★

### Oki OKIPAGE 4w Plus

**T**he OKIPAGE 4w Plus is the cheapest and smallest of the printers in this group test. At four pages per minute, it is also the slowest. Oki has put a lot of thought into the design, and it shows. The 4w Plus is a compact, stylish LED printer with a tiny footprint and only one indicator light, most functions being handled through software. Setting up is not the easiest experience. The cover does not stay up by itself, which makes it awkward to access the interior of the machine. Fitting the toner cartridge was difficult, with brute force and an excess of toner dust the order of the day. The supplied software is easy to use — essential, as Oki provides no instructions. The user manuals cover setup and troubleshooting and are by far the clearest in the group. However, they do not go into the same level of detail as many of the others.



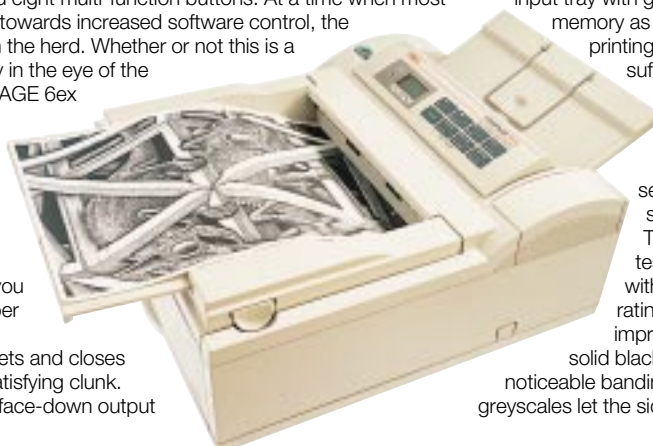
The vertical input tray holds 100 sheets and features some rather awkward paper guides. The output is ejected on top of the input tray and is limited to 30 sheets. While this is somewhat limiting, it is one of the things that helps keep the printer's footprint as small as it is. Predictably, the 4w Plus's test results suffered in comparison with the more expensive printers. The speed test showed up the 4ppm limitation, but the image-quality result shows that cheap does not have to mean inferior, beating both the Brother and the QMS.

#### PCW Details

**Street Price** £193.88 (£165 ex VAT)  
**Contact** Oki 01753 819819  
[www.oki.co.uk](http://www.oki.co.uk)  
**Good Points** Mighty cheap.  
**Bad Points** Slow. Poor image quality. Lacking in features.  
**Conclusion** A good budget buy.  
 ★★★

### Oki OKIPAGE 6ex

**C**oming from the same stable as the stylish 4w Plus (above), you might expect the 6ex to be similarly well designed. Not so: this LED printer looks distinctly old-fashioned, with its LCD and eight multi-function buttons. At a time when most printers are moving towards increased software control, the 6ex stands out from the herd. Whether or not this is a good thing, is purely in the eye of the beholder. The OKIPAGE 6ex is a sturdily-built machine with the exception of the extendable output trays, which are flimsy. With an imposing footprint, this is not a printer you can ignore. The paper input tray has a capacity of 100 sheets and closes with a particularly satisfying clunk. There is a 50 sheet face-down output



tray and a 30-sheet face-up output tray. The most impressive features of this printer are the straight paper path and the manual-feed capability. Pressing a section of the front cover flips up a neat mini input tray with guides for various paper sizes. Oki supplies 2Mb memory as standard, upgradeable to 32Mb. Native DOS printing is supported, as is 5e PCL emulation. The 6ex suffers in the speed test, achieving an overall time of 135 seconds. The FSOT of 38 seconds is similarly poor. The quality test is better, with a mid-table rating. We were impressed by the solid blacks, but noticeable banding and poor greyscales let the side down.

#### PCW Details

**Street Price** £327.83 (£279 ex VAT)  
**Contact** Oki 01753 819819  
[www.oki.co.uk](http://www.oki.co.uk)  
**Good Points** Superb manual. Good paper path design.  
**Bad Points** Pricey. Slow.  
**Conclusion** There are better printers around for the money.  
 ★★



### Panasonic KX-P6300

**T**he Panasonic KX-6300 is one of the strangest-looking printers we have come across. The tall, boxlike design may be unappealing at first, but it is actually very practical. It is easy to carry around and, more importantly, has a very small footprint, taking up little space on your desk. Setting up is straightforward, as is the software installation. The user manual is comprehensive but not quite as well written as some of the others in the group test.

The Panasonic is a budget printer and lacks many of the features present in the more expensive models. It does support 4.5 PCL emulation for DOS applications running through Windows, but there is no manual-feed mechanism nor a straight paper path. However, this is only an issue if you intend to print on non-standard media which cannot cope with the rigours of navigating the twisty interior of a printer. The supplied



memory is only 256Kb, expandable to 1.25Mb. The input tray can hold 100 sheets, while the output tray has a capacity of 50 sheets.

The Panasonic's test results were very impressive, particularly for a printer at this price. Fifth place in the quality test is down to excellent solid blacks, good white-on-black and graphic images. However, this printer really came into its own in the speed test: first page out in an incredible 19 seconds, followed by a time of 119 seconds for the entire job (beaten only by the eight-pages-per-minute Tally).

#### PCW Details

**Street Price** £217.38 (£185 ex VAT)  
**Contact** Panasonic 0500 404041  
[www.panasonic.co.uk](http://www.panasonic.co.uk)  
**Good Points** Small footprint. Quick. Quality output. Cheap.  
**Bad Points** No manual feed or straight paper path. Only 256Kb memory.  
**Conclusion** A fabulous printer as long as you don't need the missing features.  
 ★★★★★

### QMS DeskLaser 600

**T**he DeskLaser 600 boasts one of the smallest footprints in the group. Unfortunately, the benefits of this are negated by the fact that the output tray clips onto the front of the printer, expanding the space required by the size of a sheet of paper. Nonetheless, the 600 looks good and makes a stylish addition to the desktop. Setting up is simple and is well documented in the user manual. The input tray has a capacity of 100 sheets while the output tray is limited to 30 sheets. The standard paper path is fairly straight which helps when printing on non-standard media. The 1Mb memory is not upgradeable and neither PCL emulation nor native DOS printing are supported. Toner and drum are included within an Imaging Unit which averages 3,000 prints at five percent coverage.



Combining the toner and drum increases the running costs of the printer as you cannot replace the toner separately. The test results were disappointing, to say the least: a quality-test score of 43.52 put it at the bottom of the heap. Noticeable banding, terrible halftones and poor graphic-image output all contributed to its downfall.

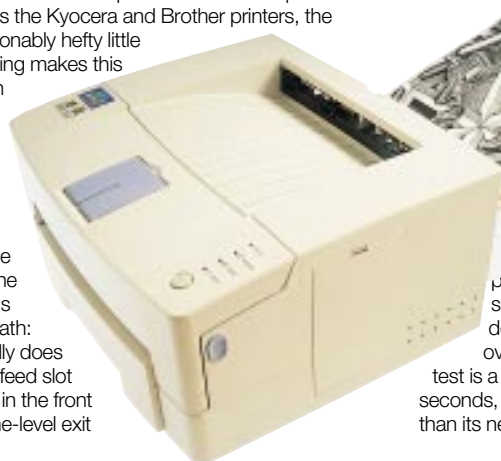
The speed-test results are also poor: 39 seconds for the first page out is the longest wait we endured, while 138 seconds for the entire job pushes it towards the back of the field.

#### PCW Details

**Street Price** £233.83 (£199 ex VAT)  
**Contact** QMS 01784 442255  
[www.qms.com](http://www.qms.com)  
**Good Points** Stylish design. Small footprint.  
**Bad Points** Poor image quality. Slow.  
**Conclusion** There are better printers around for the money.  
 ★★

### Tally T9108

**T**he Tally T9108 is the only 8ppm printer in this group test but it is by no means the most expensive. With a footprint about the same size as the Kyocera and Brother printers, the T9108 is a reasonably hefty little number. However, nice styling makes this printer one of the easiest on the eyes. Setting up is a breeze, and software installation is similarly pain free. Tally supplies an excellent Quick Reference Guide which makes a nice change from having to wade through a manual. One of the best features of the T9108 is the superb straight paper path: in this instance, straight really does mean straight. The manual feed slot is just above the paper tray in the front and leads through to a same-level exit



at the rear. The result of the image-quality test was disappointing, with the Tally appearing in the lower half of the points table. We were very interested to see what

performance increase the 8ppm engine would make on the speed test. The results show an unimpressive first page out time of 29 seconds, but don't get downhearted yet: the overall time for the speed test is a lightning-quick 105 seconds, 14 seconds quicker than its nearest rival.



#### PCW Details

**Street Price** £298.45 (£254 ex VAT)  
**Contact** Tally 01734 788711  
[www.tally.co.uk](http://www.tally.co.uk)  
**Good Points** Super-fast. Great straight paper path.  
**Bad Points** Image quality is not the best.  
**Conclusion** If you are planning to print reams and reams of text, this is the one for you.  
 ★★★★★

Colour laser printers

**J**ust as it's getting hard to buy a monochrome-only inkjet printer, it won't be too long before the same will be said about colour laser printers. Okay, the personal colour laser printer may be some way away, but it was only a matter of time before monochrome lasers migrated to the individual desktop.

The move towards colour is inevitable for the simple reason that colour conveys more information. It also helps draw the reader in, whether you're printing a brochure, a newsletter, or even a simple business letter. And the current crop of colour lasers deliver more than adequate print quality at both a reasonable speed and price to make them increasingly attractive to small business and workgroups.

They've come a long way, too: the new printers are smaller, lighter, less expensive and easier to use and administrate. They also produce much better-quality colour output than earlier models. Accordingly, the market for colour laser printers is expected to boom: Dataquest forecasts a ten-fold increase in colour laser printer shipments, growing from 32,600 units in 1995 to 304,000 in 2001.

Colour lasers work in an almost identical manner to monochrome (see "How laser printers work", p200). In a monochrome laser this involves just black toner; in a colour laser it additionally involves cyan, yellow and magenta toner, and many colour lasers require the page to make four passes through the print engine in order to collect all four dustings of toner. It's easy to see why colour lasers are so much slower than their mono brethren, with typical speeds in the two- to three-pages-per-

minute (ppm) range. However, when you compare like with like, most colour lasers can knock out black text at a pretty respectable double-figure ppm rate. Note that most colour lasers are primarily PostScript printers, a reflection of the graphics markets these devices are primarily sold into.

Print quality is one area where colour lasers have made major improvements. While most are still bettered by the new wave of very affordable photo-realistic inkjet printers, when it comes to speed they are hard to beat: whereas a full-colour page can take anything from ten to fifteen minutes to produce on an inkjet printer, a colour laser will typically take less than 30 seconds. No other colour printing technology comes close to lasers for output speed.

Most colour lasers offer 300dpi print resolutions but most modern models offer 600dpi, while the Tektronix 560 offers 1,200dpi. However, pure resolution is not everything in colour printing. Most laser printers are incapable of printing shades — they can either place a "dot", or they can't, so they resort to a process called dithering to give the appearance of shading. One cost of dithering is that the effective resolution for the printer is based on the number of dithering cells. With dithering cells of five dots across and five dots down, the effective resolution on a 300dpi printer is only 60dpi (300 divided by five). Some printers can reduce the sometimes-obvious appearance of dithering by offering multi-level or continuous tone (contone) printing.

Contone printers can print more than one shade of each colour per dot. This is typically just 16 shades, considerably less than the 256 shades most thermal dye printers can manage. Thus they still need dithering to produce 16.7 million colours, although they don't need as many dots per cell to simulate a given number of colours.

Cost of ownership is a popular topic



among printer vendors and users,

and while colour lasers are both dearer to buy and run than their monochrome rivals, their mono-only text-printing costs per page are only very slightly dearer. This allows colour lasers to wear two hats in a department — as a normal text printer for run-of-the-mill printing, and as a full-colour printer for special reports and presentations.

The choice of colour laser printers is pretty wide these days, with most major manufacturers offering at least one model. As with mono laser printers, the number of printer models may be high but the number of print engines is low. A popular choice is the Canon P320 engine which is found in the Digital ColorWriter 2000, the Lexmark Optra C, the IBM Network Color Printer and the Canon CBLP 360PS, among others. Minolta is another print engine maker: as well as driving its own Color PageWorks, it's also found under the bonnet of the Lexmark Optra SC1275. As well as a good print engine, final output quality is also determined by the raster image processor (RIP) and many vendors have plumped for EFI's Fiery RIP in their colour printers.

So what's a good colour laser? Currently top of the tree is Tektronix with its excellent Phaser 560 and Phaser 350 (although to be pedantic, this is a solid inkjet printer and not a laser) (\$5,000 street). Another good performer is the Lexmark Optra SC 1275, as is the Xerox DocuPrint C55mp and the aforementioned inexpensive Minolta Color PageWorks.

Roger Gann



Brother HL-730 Plus



Canon LBP-660



Epson EPL-5500



Hewlett-Packard LaserJet 6L



Kyocera FS-600



Lexmark Optra E+



Minolta PagePro 6



Oki OKIPAGE 4w Plus



Oki OKIPAGRE 6ex



Panasonic KX-P6300



QMS DeskLaser 600



Tally T91082



Personal  
Computer  
World  
**Editor's  
Choice**

### Editor's Choice

**W**e were impressed by the overall quality of the twelve laser printers in this group test. We encountered very few problems in setting up and installing the different machines, and there is no genuinely bad printer in sight. However, some are definitely better than others, and we are basing our judgements as follows: print quality is obviously very important, as is the basic speed of the engine. The prices of the printers vary from around £190 to £350 and there is a world of difference in the range of features offered. Value for money is therefore our third concern.

The first **Highly Commended** award goes to the **Kyocera FS-600**. At £280 this is a reasonably-priced printer with an impressive 2Mb memory as standard. It topped the charts in the image-quality tests and only misses out on Editor's Choice because of the disappointing speed test results.

The **Tally T9108**

takes the second **Highly Commended** spot. This eight-page-per-minute printer is lightning-quick over long print jobs and has a good range of features.

The third **Highly Commended** award goes to the **Minolta PagePro 6**. This is a quick, fully-featured printer with excellent image-quality output. The one drawback is the £351 price tag, but if you need an all-singing all-dancing laser printer, this could well be the one for you.

**Editor's Choice** is the **Panasonic KX-P6300**. This is one of the cheapest printers in the group, at a bargain £217. While it lacks many of the features present in the more expensive models, the low price tag coupled with fabulous results in both the speed and quality tests, makes the KX-P6300 a terrific bargain.



Before you bite the bullet and buy your printer, spare a thought for the running costs. Each page you print costs you money; how much depends on the paper you use, and the cost and capacity of the toner cartridge and drum. To complicate matters further, some manufacturers combine the toner and drum in a single unit, forcing you to replace both parts when the toner runs out. These are costs

you need to balance against your projected use of the printer: heavy users should place greater emphasis on the cost of consumables than users making light use of a printer.

This month's PCW cover CD contains a handy utility which allows you to compare the lifetime costs of a range of popular printers. Printer Audit can be found in the Software Library section.

### How laser printers work

**A** laser printer needs to have all the information about a page in its memory before it can start printing. The laser inside the printer is used to draw on a photo-sensitive drum. It takes the image from the memory and, as it tracks from left to right, the laser is turned on and off. Moving the whole laser would be a major mechanical task and is unnecessary. All that has to be moved is the laser beam and this, as with all magic, is done with mirrors.

The printer has a small eight-sided drum and as this spins, the laser moves across the photo-sensitive drum. You can see the same principle in operation if you look at a mirror ball in a disco. The lights bounce off the ball on to the floor, track across the floor and disappear as the ball revolves. In the printer, the mirror drum spins incredibly quickly and is synchronised with the laser switching on and

off. A typical laser printer will perform millions of switches (on and off) every second.

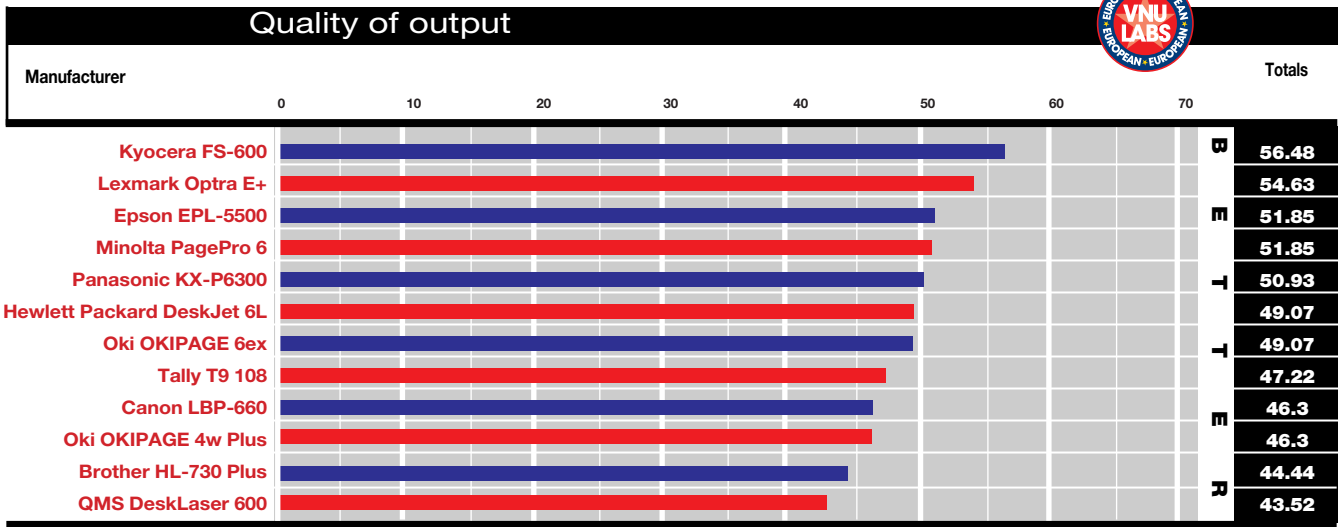
The laser works like a stick drawing in dirt, where the dirt is a static charge on the photo-sensitive drum. Where the laser is turned on, it hits the drum and knocks the charge off. Where the laser is turned off, the charge remains. Inside the printer, the drum rotates to build one horizontal line at a time. Clearly, this has to be done very accurately. The smaller the rotation, the higher the resolution of the printer. Similarly, the faster the laser beam is switched on and off, the higher the resolution.

As the drum rotates to present the next area for laser treatment, the written-on area moves into the laser toner. Toner is a fine dust, usually jet black for traditional monochrome printing but also available in cyan, magenta and yellow for colour printing. The image builds up on the drum as the toner is attracted

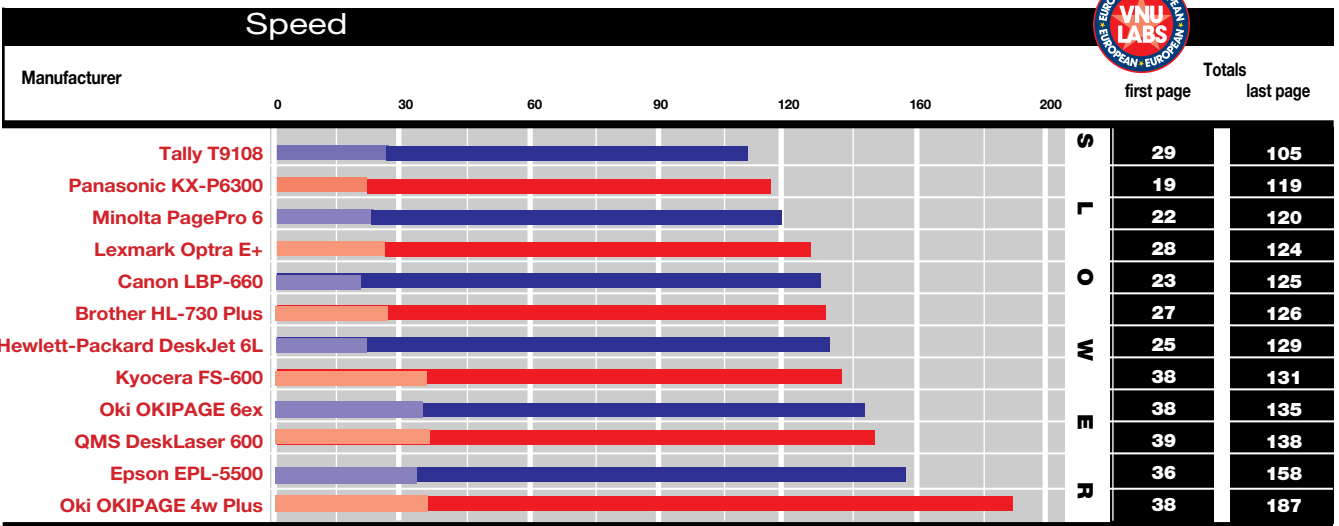
to it by the charge. As the drum rotates, it is pressed against the printing paper which is fed in by a set of rubber rollers. The toner rubs off onto the paper and, as a page of dust will not last long, the paper then passes under a heated roller to melt the toner on.

The page then slides further out of the printer with the drum continuing to rotate and needing to be cleaned. There are two forms of cleaning, physical and electrical. With the former, the toner which was not transferred to the paper is mechanically scraped off the drum and collected in a waste bin. Electrical cleaning takes the form of covering the drum with an even electrical charge so that the laser can write on it once more. This operation is performed by an electrical element called the corona wire. Both the felt pad which physically cleans the drum, and the corona wire, should be changed regularly.

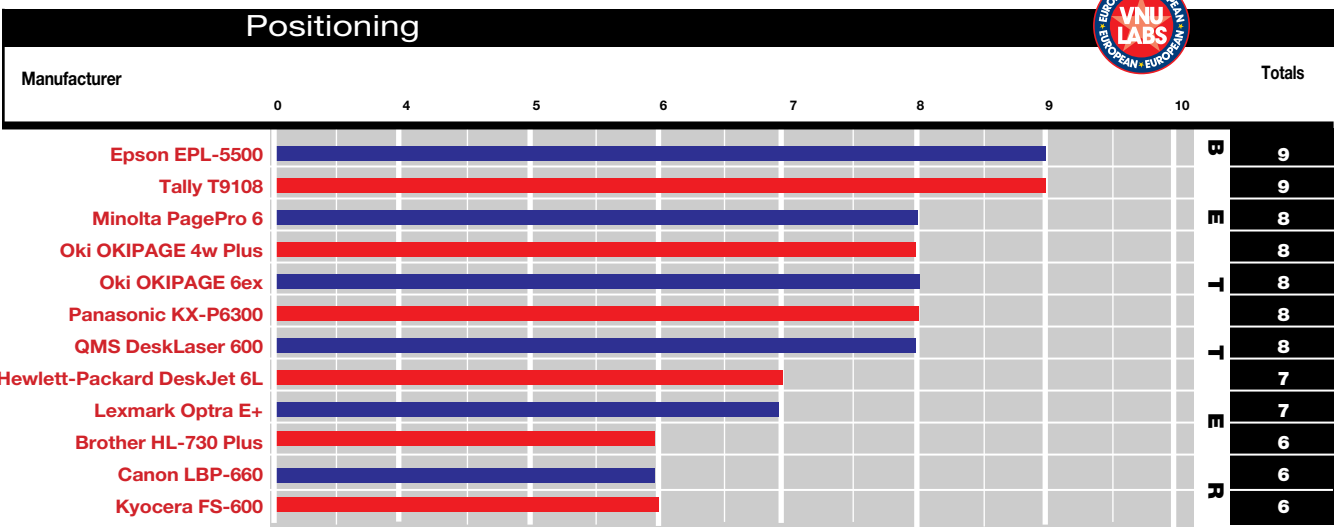
Gordon Laing



A score garnered from many pages of printouts covering text, graphics, lines, resolution, halftones, black solidity etc.



Time taken in seconds to print out 11 pages of dense text.



Accuracy and consistency with which the printer positions the printed matter on the page.


















Table of Features						
						
Manufacturer						
Model Name	HL-730 Plus	LBP-660	EPL-5500	LaserJet 6L	FS-600	Optra E+
Street price (ex. VAT)	£199	£184	£274	£232	£239	£299
Street price (inc VAT)	£233.83	£216.20	£321.95	£272.60	£280.83	£351.33
Telephone	0161 330 6531	0500 550111	01442 261144	0990 474747	01734 311500	01628 481500
Fax	0161 931 2205	0121 693 5070	01442 227227	0171 735 5565	01734 311108	01628 481894
Web address	www.brother.com	www.canon.co.uk	www.epson.co.uk	www.hp.com	www.kyocera.co.uk	www.lexmark.co.uk
Standard warranty	1 yr RTB	1 yr on-site	1 yr RTB	1 yr RTB	1 yr RTB	1 yr RTB
Technical Features						
True DPI level	600 x 600	600 x 600	600 x 600	600 x 600	600 x 600	600 x 600
PCL level	4	4	5e	5e	5e	5e
Native DOS printing	●	○	●	●	○	●
Memory	1Mb	256Kb	1Mb	1Mb	2Mb	2Mb
Maximum memory	2Mb	256Kb	32Mb	8Mb	34Mb	6Mb
Size in mm (w x d x h)	366 x 353 x 250	336 x 321 x 249	352 x 204 x 217	335 x 312 x 228	363 x 360 x 222	348 x 246 x 219
Weight (kg)	6.5	7	5	7	8.5	6
Raw engine speed (ppm)	6	6	6	6	6	6
Paper Handling						
Input capacity (sheets)	200	100	150	100	150	150
Output capacity (sheets)	100	50	100	100	150	100
Manual paper path	●	●	●	●	●	●
Interfaces						
Parallel	●	●	●	●	●	●
Ethernet	○	○	○	○	○	○
Serial	○ (optional)	○	○ (optional)	○	○ (optional)	○

Table of Features						
 						
Manufacturer						
Model Name	PagePro 6	OKIPAGE 4w Plus	OKIPAGE 6ex	KX-P6300	DeskLaser 600	T9108
Street price (ex VAT)	£299	£165	£279	£185	£199	£254
Street price (inc VAT)	£351.33	£193.88	£327.83	£217.38	£233.83	£298.45
Telephone	01908 200400	01753 819819	01753 819819	0500 404041	01784 442255	01734 788711
Fax	01908 200398	01753 819899	01753 819899	01789 200290	01784 461641	01189 791491
Web address	www.minolta.co.uk	www.oki.co.uk	www.oki.co.uk	www.panasonic.co.uk	www.qms.com	www.tally.co.uk
Standard warranty	1 yr RTB	1 yr on-site	1 yr on-site	1yr on-site	1 yr RTB	1 yr on-site
Technical Features						
True DPI level	600 x 600	600 x 600	600 x 600	600 x 600	600 x 600	600 x 600
PCL level	5e	4.5	5e	4.5	none	4.5
Native DOS printing	●	○	Yes	○	○	Yes
Memory	2Mb	none	2Mb	256Kb	1Mb	1Mb
Maximum memory	18Mb	n/a	32Mb	1.25Mb	1Mb	17Mb
Size in mm (w x d x h)	340 x 216 x 210	310 x 191 x 150	320 x 360 x 175	132 x 378 x 287	320 x 306 x 146	360 x 364 x 176
Weight (kg)	6	3.8	7.7	6.5	6	9
Raw engine speed (ppm)	6	4	6	6	6	8
Paper Handling						
Input capacity (sheets)	150	100	100	100	100	150
Output capacity (sheets)	100	30	50	50	30	100
Manual paper path	●	●	●	○	○	●
Interfaces						
Parallel	●	●	●	●	●	●
Ethernet	○	○	○	○	○	○ (optional)
Serial	○	○	○ (optional)	○	○	○ (optional)

Key: ● Yes ○ No

Mon		7	14	21
Tue	1	8	15	22
Wed	2			23
Thu	3			24
Fri	4			25
Sat	5			26
Sun	6			27



Best before....

2000



Ex. Date..... 31/12

AD BCE OGHAN 27371X

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ACME REGIONAL E

Our computer  
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# Tale of the century

As if the inevitability of a hangover weren't enough, 1st January 2000 will bring many IT headaches, too. Paul Wardley provides the low-down on how to survive the year 2000.

**A**s you read this, you may not yet have shed those extra pounds you put on over Christmas and might still be remonstrating with yourself about the self-inflicted headache brought on by over-zealous indulgence in the New Year festivities. If it's any comfort, this is nothing compared to the headache you'll be facing after the millennium celebrations — unless you act now.

At the start of the year 2000, millions of PCs are going to get confused when they're switched on for the first time: spreadsheet and database programs which have hitherto worked perfectly, could start producing nonsensical results; scheduled network activities may take place randomly or not at all; and accounting systems bulging with data could mysteriously refuse to run.

PC users who bought their equipment in good faith didn't find any warning stickers stating "May not function after 1999" and might be forgiven for being caught unawares, but the problems faced by large enterprises are mostly self-inflicted and stem from poor programming techniques going back 30 years or more. Either through lack of forethought or in a deliberate attempt to minimise the costs of data storage, many programs were written to accept the input of six-digit dates in the form 12/01/98. The century 1900 was implied and not stored along with the rest of the date.

Now the year 2000 is approaching, programs based on six-digit date formats are refusing to accept 21st century dates or, worse still, apparently accepting them but treating them internally as 20th century dates. This can cause relatively trivial problems like the wrong date on a report, but there are implications involving the integrity of entire systems. Order and invoice processing is impossible without accurate date computations, as are financial transactions and scheduled maintenance plans.

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## Ratings

- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended

**It's your problem**

Smaller enterprises relying on PCs rather than mainframes face different problems to those besetting corporates, but the problems are equally real and the worrying thing is that users have not yet started to address the issues. Those who will suffer are the pedants who insist the new millennium starts on 1st January 2001. They're right. But the rest of us will be celebrating the event a year early, which is when the so-called millennium bug will hit PCs.

Last year, the government set up an organisation called Action 2000 with a brief to help companies prepare for the millennium. With only £1m funding it's unlikely that Action 2000's activities will filter down to medium and small businesses, let alone individual PC owners, so the best course of action is one of self-help. In the jargon of the nineties, you have to take ownership of the problem, and your first task is to understand how computers and software are affected. You can then test them and implement any changes needed.

**Problems, problems...**

PC users have to track down two types of problem, one of which is essentially the same as that facing mainframe users: it resides in commercially-produced software that may not react as expected to the input of six-digit dates in the next century. The other is a flaw in the design of the PC itself, in its real-time clock (RTC) which does not recognise the arrival of the year 2000. The flaw has been there since the introduction of the IBM AT in 1984, but is

only now making its presence felt. The first PC and XT computers were not fitted with real-time clocks and had to have the date entered manually each time they were booted, but the AT introduced two innovations: CMOS RAM to store configuration information, and the inclusion of a real-time clock. Both were integrated in a Motorola MC146818 chip, which provided 64 bytes of CMOS RAM (14 for the real-time clock plus 50 for configuration information) powered by an external battery.

The Motorola chip and its later replacements, like the DS1287, which combines the clock, CMOS and battery in a single module, contain the same basic flaw. While the real-time clock is ticking it constantly updates the time and date stored in CMOS RAM, but does not update the century byte, which always stores the value 19.

PCs don't actually use the real-time clock when they're running. The time from the RTC is picked up by the BIOS and sent to the operating system when a computer boots up. From then on, the operating system keeps its time by counting the ticks of an interval timer. When 31st December 1999 ticks over into 1st January 2000, the operating system will display the correct date, but the century byte in CMOS will remain at 19. So the next time the computer is booted, the BIOS reads the wrong century from the real-time clock. Several things can happen at this stage:

1. If the BIOS does nothing and passes on the year 1900 in the usual way, DOS and Windows will reset the system date to 4th January 1980 or some other arbitrary date they can understand.

2. A more capable BIOS will realise the date is wrong and pass on the correct 2000 date to the operating system, although the RTC century will still be set at 19.

3. A clever BIOS will not only pass on the correct date to the operating system, it will also update the century byte in CMOS from 19 to 20 so the problem does not arise again. The majority of PCs simply pass on the incorrect date, which is when the trouble begins.

**Avoiding date disasters**

If the system date of a PC used for entertainment, recreation or creative graphics goes out of kilter it may not matter, but any business PC is bound to employ dates within programs like spreadsheets, databases and PIMs and for date-stamping files. Worse, appointment books, accounts software, schedulers and many other applications include

**Quick hardware test**

The way in which to test a PC's ability to handle the year 2000 rollover is to simulate the turn of the century and see what happens. In essence, this is what commercial diagnostic programs do on your behalf. Testing should be done in DOS, not Windows, so if you want to test a Windows NT machine you need a bootable system disk from a DOS or Windows PC. It's a good idea to conduct tests from a bootable floppy whatever machine you're testing. This avoids the pitfall of inadvertently starting Windows with an invalid system date.

1. Boot the PC from a floppy disk and at the A: prompt type Date. Enter 31 December 1999
2. Type Time and enter 23:59:50
3. Wait at least ten seconds to give the clock time to roll into the 21st century. At this stage it's a certainty that the DOS clock will correctly show 1/1/2000. You can check this by typing Date again.
4. Switch off the machine and reboot into DOS from the floppy disk. Type Date and see what it says. If it's 1/1/2000 either your PC has a correctly functioning real-time clock, or the BIOS has automatically corrected the date discrepancy. If the date is 4/1/80 or anything other than 1/1/2000, the machine has problems and you should go to the next step.
5. A PC that cannot roll correctly into the year 2000 is still viable as long as it can retain year 2000 dates when entered manually. To test, type Date and enter 1st January 2000. Switch off the PC for a few seconds and reboot.
6. Type Date. If it says 1/1/2000, the PC will work fine in the year 2000, but you'll have to set the date manually when it arrives. Most PCs are like this. If you encounter one that cannot hold a year 2000 date having manually entered it and rebooted, you must upgrade the BIOS.
7. Do not forget to set the correct date and time before rebooting from the hard disk!



ViewCMOS can be used to see what a real-time clock does during a century rollover. Byte 50 (circled) indicates the century date

clean-up routines which automatically purge out-of-date files, and the results of running these with an incorrect date could result in huge loss of data.

But all is not doom and gloom: the hardware date defects of a PC can be fixed. In most cases, manually entering the correct date in the year 2000 will reset the CMOS century byte and forestall any problems. In situations where you cannot trust users to do this for themselves, a software fix can be implanted in their PCs to change the century automatically. Good news for users of Windows NT 4.0 (or NT 3.51 with service pack 5) is that the operating system itself will detect the RTC defect and correct it at the turn of the century.

Sadly, there is a small minority of PCs which won't respond to this type of correction. They have BIOSes that cannot handle 21st century dates. A well-known culprit is the Award 4.50G BIOS (released between 26th April 1994 and 31st May 1995) which must be upgraded.

Nearly all PCs can operate successfully in the next century once dates have been set, but there are arguments in favour of modifying them so they can enter the year 2000 unaided. One is that if a PC is left running overnight on 31st December 1999, although the OS time is correct, any software that gets the date from the real-

time clock could go haywire. This is true, but we haven't been able to trace any commercial Windows software that uses the RTC in this way. A more compelling reason for upgrading a PC is to save the trouble of having to manually reboot and reset every machine on a network on the first working day of the year 2000: an onerous task which it would be easy to get wrong.

**Ensuring hardware compliance**

If you decide that automatic entry into the year 2000 is not essential, you should still test your PCs to ensure they are able to run properly after a manual date change. If you have only a couple of PCs to test, you can do it yourself by following the instructions in our "Quick hardware test" (p210). If you find this prospect daunting, you can use one of the commercial programs designed to test a PC's year 2000 readiness. Most are sold alongside a hardware or software "fix" which enables the PC to tick over into 2000 without attention. The fix is either a memory-resident program that constantly monitors the time and updates the RTC when required, or an extension BIOS which plugs into an ISA expansion slot and does the same thing.

The cheapest, most reliable fix is to upgrade a PC's

BIOS. Most PCs contain reprogrammable BIOS chips for which updated code can be downloaded from motherboard manufacturers' web sites along with a flash programming utility to perform the task. However, there are reasons why this may be neither a desirable nor practical solution. BIOS designers such as Award and AMI do not supply code direct to end-users; they licence it to motherboard manufacturers and you have to get it from them. It can be difficult to determine the motherboard supplier and the exact type of BIOS required, especially if you have bought your PCs at different times, from different suppliers.

Another pitfall is that flash-programming a BIOS means blanking it first, so for a short period you're working with an essentially brain-dead PC which won't restart if things go wrong. The flash BIOS solution is more likely to appeal to a single-PC owner than to someone running a small business network without the help of a professional administrator.

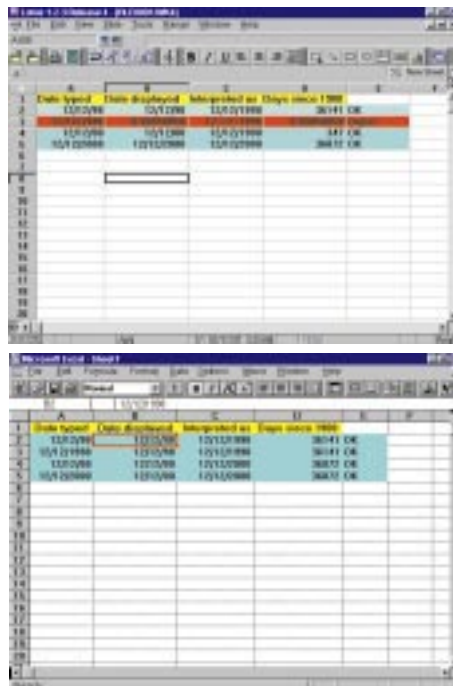
**How to check your software**

Bespoke programs are difficult to check for year 2000 compliance and may need to be modified or rewritten. Off-the-shelf Windows programs can cope with 21st century dates but you must determine how date entries are interpreted and, if necessary, modify working practices in line with your software.

Many software houses have web pages explaining year 2000 compliance but some of the information could be misleading. The Lotus web site states: "All versions of 1-2-3 currently accepts (sic) both two-digit and four-digit year designations". See Fig 1 to judge how accurate is this statement. It is true that Lotus 1-2-3 version 4 accepts four-digit dates — but not in this century. It is not an insuperable problem but one which users need to know about. If you are wondering who is still running version 4, the answer is hundreds of thousands of people. It was the bee's knees four years ago and Lotus Organizer 1.x was sold up until 1995, yet it can only support dates between 31st December, 1990 and 31st January, 2001.

There are anomalies in programs from other suppliers: Quattro Pro 7 assumes that all two-digit dates fall in the 20th century but Quattro Pro 8 thinks dates between "00" and "50" are in the 21st century. Excel 95 and Access 95 agree that a two-digit date of "20" represents 1920, but Access 95 thinks the year "19" is in the 20th century and Excel 95 thinks it's in the 21st — and these two programs are part of the same suite! Do those in your organisation using a spreadsheet or database know its date rules? Do you? This checklist will help you plan for 2000:

1. Contact your software suppliers now.
2. Find out the ground rules for the way all your programs handle dates.
3. Test the rules to ensure they are unambiguous.
4. Make a log of all data files which contain dates.
5. Check data files to see if dates are entered appropriately and if date functions work as expected.
6. Work out rules for how dates should be entered from now, and in the 21st century. You may need to change entry techniques after 31/12/99.
7. Make sure everybody knows the rules and starts applying them now.



**Fig 1 Lotus 1-2-3 (top) and Excel (above): two very different ways of handling dates and a headache for anyone who uses both programs**

## Year 2000 myths and realities

### Myths

- Non-compliant PCs will disintegrate on 1st Jan 2000.
- If you ignore the problem, it will go away.
- Microsoft, Corel, Lotus and the like wouldn't sell software which wasn't ready for the year 2000.
- Your supplier told you that your PCs are year 2000 compliant so you don't need to check them.
- There's plenty of time before the year 2000.

### Realities

- Checking and fixing hardware bugs is easy and should be tackled first.
- Rumours that many PCs do not understand leap year dates in the 21st century are unfounded.
- Checking software for year 2000 compliance is hard and time consuming. The sooner you start, the better.
- Nobody is going to invent a "magic bullet" to fix bugs.
- There are 97 weeks until the year 2000.

### Software compatibility

Testing your hardware and getting it ready for 2000 is relatively straightforward. The time-consuming job is working out which apps on a PC use dates and then finding out how they're going to handle them post-2000.

Software most affected will be spreadsheets and databases and, even on a compliant PC, the way in which 21st century dates are interpreted will lead to problems, especially where computations are involved. A program running scheduled services (anti-virus checks, backups, accounts reconciliation, project and time management) could cause problems by incorrectly interpreting a two-digit year and placing it in the wrong century.

Underlying the applications software on all PCs is the operating system. According to Microsoft, if you use any of its systems you needn't worry, because "From day one, with the initial work on the MS-DOS operating system, Microsoft incorporated the capability to handle dates well into the next century." Er, sorry Microsoft, although we agree that DOS and Windows 95 can handle future date formats, an OS that resets the system date to 4th January 1980 when it is fed an apparently invalid year falls some way short of perfection. Wouldn't it have been better to build in an error handler that stated: "The system date appears to be invalid...please enter the correct date" or would that have been too simple?

The soon-to-arrive Windows 98 includes a fix for non-compliant PCs along the lines of those currently provided by third parties, but this is small consolation to DOS and Windows 95 users. For help through the date minefield, including how popular Windows software is affected, see our advice on "How to check your software" (p212).

The evidence is that most companies are committed to producing programs compliant with the year 2000 from now on, yet few are willing to accept that their older products are deficient and none has, at the time of writing, announced any sort of free upgrade scheme.

The reason you cannot expect a software provider to take on this responsibility is that you have not bought its software; you have only bought a licence to use it. The small print in the licence always includes a statement of limited liability along the lines of Microsoft's: "The software will perform substantially in accordance with the product manuals for a period of 90 days from the date of receipt". Buyers haven't a leg to stand on unless the media itself is corrupt and a program will not load.

### Bespoke bugs

Checking off-the-shelf software is a headache but it can be done. This may not be the case with bespoke programs written in conventional computer language or developed using the applications programming languages built into many databases. Each version of dBase from III+ onwards has support for 21st century dates via an internal yyyyymmdd date format, but nothing compels programmers to use it and it was common practice to store dates in six-character strings to save on storage space and make them easier to manipulate.

Problems will be caused by specially devised internal date calculations which do not correctly compute across the century boundary and through the use of codes like 00/00/00 and 99/99/99 to indicate ends of files or to mark records for deletion. In the worst cases, a program may have been written to accept dates only within a certain time window, such as "01/01/85" to "31/12/99".

To check customised applications, look at their source code. If this is no longer available you have little alternative but to run sets of test data through them on a PC set first to 20th and then 21st century dates. Suspect programs will have to be replaced or rewritten. ■

## The year 2000 in the home

Home owners face the same problems as business users, but in cases where a PC is used for non-critical applications like word processing, DTP and multimedia, which are not date-sensitive, the implications of running a PC with the wrong date are not too worrying. There's no room for complacency and if you have a home PC you should test it to ensure it can retain year 2000 dates even if you don't plan to install a fix. Manually setting the date in the year 2000 will suffice where the machine is not going to be used during the century rollover. Users of spreadsheets, databases and PIMs should check with software suppliers about the way two-digit dates are interpreted by their

programs. It may be necessary to re-enter some dates and date formulas in order for them to function correctly in 2000 and beyond. As well as the obvious problems for PCs, many of our household gadgets are in fact computers under another name. VCR recorders, central-heating timers and burglar alarms all include embedded controllers that could be affected by the millennium bug. Because embedded controllers don't interact with an operating system you won't encounter the type of problems caused by DOS turning the date back to 4/1/80, but it is possible that clocks governed by embedded controllers could turn back to 1900 or stick at 1999.

Testing such devices is quite straightforward: set the time to just before midnight on 31/12/99 and see what happens. Fixing them is problematic because it involves changing the chips inside, and you have no option but to contact the manufacturers or vendors. Embedded controllers are used outside the home. Police in Cambridgeshire and Derbyshire have cancelled leave during the year-2000 celebrations because of the havoc which may ensue. The Police IT Organisation fears that every burglar alarm could go off at midnight on 31st December 1999, and evidence from security cameras could become inadmissible if the screen shows the wrong date.



## Prove It 2000

**T**his program has a Windows interface but there is a command-line version on the disk.

It is a one-shot test which copies a PC's system files from the hard disk to its copy-protected floppy. Users run through a series of options to test a PC, view the results, make a log of the software on the hard disk and read advice on how to proceed. The fix, if it is required, is a TSR program occupying around 400 bytes.

Prove It's tests are performed in DOS and involve two user-assisted reboots. All three clocks — BIOS, RTC and the operating system — are tested during power-on and power-off rollovers. Although Prove It passes and fails a PC on individual tests, it is cautious about interpreting the results and informs you of the *probability* of a PC being compliant. The user must decide whether to install Prove It 2000's fix, install a BIOS upgrade, or



do nothing. Two software scanners have been provided, which jointly return a list of DOS and Windows programs on a hard disk.

Personal Computer World  
**Editor's Choice**

The Windows interface is familiar but Prove It 2000's tests are performed in DOS. Software scanning takes place in Windows

### PCW Details

Price £39.95 (£34 ex VAT); site licences available.

Contact Ninety-Nine 2000: 0990 991999 [www.proveit2000.com](http://www.proveit2000.com)

Ease of use ★★★★★

Features ★★★★★

Overall ★★★★★

## Span 2000

**S**pan 2000 is supplied on a single floppy disk, mercifully free of copy protection. It installs and runs from a DOS prompt and during the testing process performs a soft reboot. On completion of the tests it announces whether the test machine is year 2000 compliant. If it's not, Span 2000 offers to install a fix.

Span 2000's notion of a compliant PC is one that reports the correct date whether or not it is switched on at midnight on 31st December 1999. It tests this by checking the dates reported by DOS and the BIOS during a power-on rollover and after a reboot. It does not read the real-time clock directly and in effect simply automates the actions performed in a manual test.

The software fix is a 512-byte device driver loaded through CONFIG.SYS. Span 2000 can be invoked from a network login script



(a sample is provided) and by responding to DOS error-level codes a server can test and audit a PC, installing the fix if needed.

A basic software scanner tries to identify files containing dates, but flags so many files wrongly that it's not worth using.

Personal Computer World  
**Editor's Choice**

Span 2000 states categorically whether or not your PC has passed its millennium tests and highlights its decision in red

### PCW Details

Price £229 (£195 ex VAT) for unlimited single-site use.

Contact Span 2000; 0800 897695 [www.span2000.com](http://www.span2000.com)

Ease of use ★★★★★

Features ★★★★★

Overall ★★★★★

## Shareware tools

**T**here are several freely available programs to help you test and, if necessary, fix PCs with hardware rollover problems.

■ **Ymark2000**, available from NSTL at [www.nstl.com](http://www.nstl.com), addresses the main problem with manual testing: when a machine correctly rolls over into the year 2000 after a reboot, you don't know whether it's because the real-time clock is correct or because the BIOS has adjusted it. Ymark2000 tells you. It performs additional tests on leap year compatibility and can be used to verify that any software fix you install works.

■ **Doschk**, from Saphena at <http://ourworld.compuserve.com/homepages/saphena>, runs from DOS or Windows and reports on the state of the BIOS, RTC and system clocks after a simulated rollover into the year 2000. It does not tell you whether a

PC can retain a manually-entered year 2000 date but, like Ymark2000, it is useful for testing the efficacy of a fix.

■ **ViewCMOS**, available from its author at

[www.righttime.com](http://www.righttime.com) and from shareware sites, provides an interactive view of the date and time in the real-time clock, as well as the rest of the information stored in CMOS.

Fascinating stuff, and useful for checking the response of the RTC during a rollover test.

■ **Date 2000** (pictured, left) from Schoolhouse Computers at [www.schoolhs.demon.co.uk](http://www.schoolhs.demon.co.uk), comprises a diagnostic program and a TSR fix for non-compliant PCs. It's free for personal use and there are site licensing deals for businesses. The test program is not as easy to install as some of the commercially available products, but Schoolhouse may well have a new product available by the time you read this. Site licences cost between £15-£25 per PC. ■







Editor's Choice

**A**ll five programs reviewed here provide software fixes to correctly compensate for the defects in non-compliant test machines, but some are more efficient than others. While the Prove It 2000 fix occupies around 400 bytes of memory, Millennium Bug Toolkit's claims over 9Kb. This has implications for network workstations that are low on base memory.

Date-a-Fix is suitable only for home users who, because it is cheap, will forgive its clunky interface, but any of the other four can be used with confidence in a business environment, provided you interpret their results sensibly.

Fix 2000 could lead the unwary into believing that a compliant PC needs fixing. We had problems running its fix as a device driver but it has the advantage of being able to test any number of PCs and is supplied on a bootable floppy. Millennium Bug Toolkit performs a comprehensive set of tests and offers advice on software compliance, but it is rather tedious to install and use.

Our **Editor's Choices** are **Prove It 2000** or **Span 2000**, depending on how many PCs you have to test. The latter is the best option if you have more than five PCs and its unlimited site licence means the more machines you test, the cheaper the unit costs. Prove It 2000 is the one to choose if you have up to five PCs, which can be tested and fixed for £34 each. Site licensing deals are available, but the



unit cost is relatively high unless you have thousands of PCs. Both programs include software scanners to log the executable programs on a hard disk and provide a starting point for enquiries into which of them might need updating.

Whatever diagnostic program you choose, or even if you decide to test manually, the good news is that there's plenty of time before 2000 to check

and fix hardware compliance. Evaluating software may take longer, especially if it involves checking and correcting ad-hoc spreadsheets and databases set up by individuals over the years.

If you leave it too late, the 2000 changeover could interfere with day-to-day business operations. Start now, and squeeze it into your normal review, maintenance and upgrade schedules. ■



Hot dates: Prove It 2000 (top) and Span 2000 (above)

Table of Features

Supplier	Computer Experts	Ninety-Nine 2000	Span 2000	Deeside	Eurosoft
<b>Name</b>	Millennium Bug Toolkit v2.15	Prove It 2000	Span 2000	Date-a-Fix	Fix 2000
Tel	01273 696975	0990 991999	0800 897695	0800 7310574	01202 297315
URL	<a href="http://www.computerexperts.co.uk">www.computerexperts.co.uk</a>	<a href="http://www.proveit2000.com">www.proveit2000.com</a>	<a href="http://www.span2000.com">www.span2000.com</a>	<a href="http://www.date-a-fix.com">www.date-a-fix.com</a>	<a href="http://www.eurosoft-uk.com">www.eurosoft-uk.com</a>
Price (inc VAT)	£44.65	£39.95	£229.13	£19.99	£35.19 / £58.69
Price (ex VAT)	£38	£34	£195	£17.01	£29.95 / £49.95
Checks compliance	●	●	●	●	●
Provides software fix	●	●	●	●	●
Provides hardware fix	○	○	○	○	●
Downloadable?	Demo version	No, but online demo	○	○	○
Suitable for business use?	●	●	●	○	●
Suitable for home use?	●	●	○	●	●
Notes	MBT provides more help with software than any other package.	The only program group with a Windows interface.	Personal version for around £25 is due soon.	Cheapest program on test.	Hardware fix is safest as it can't be erased.

Key: ● Yes ○ No

# Nod and a wink

Gone are the days of cursing your hardware and making rude gestures at Win95: your PC will soon understand your movements as gestural interfaces gather speed. Toby Howard takes a look at a technology which is just around the corner.

**O**ver the years, *Futures* has reported on ideas for improving the human-computer interface. Now there's a new approach to solving the problem: instead of manipulating keyboards and mice, we shall simply make gestures to our computers. "Hand-waving" will take on a whole new meaning.

At this summer's SIGGRAPH conference, the most prestigious event in the computer graphics calendar, gesture technology was making a big splash. In the Electric Garden, the showcase for new research, several systems based on gesture analysis were on display. Sony was demonstrating a gestural interface for its PlayStation game, *Tenshindo*. Developed with Pasadena's Holoplex company <[www.holoplex.com](http://www.holoplex.com)>, the system uses video cameras to capture the movements of the two players' bodies. The video images are processed in real time to extract silhouettes which are then matched holographically (exactly how is not revealed) against a set of standard moves which a game character can perform. The closest match is then used to control the character.

According to those who tried the system at the Electric Garden, the results were amazing: as their clumsy kicks and jumps were instantly transformed into the lightning-fast movements of the game characters, the players felt involved with the game action in a way they'd never experienced before. Although the gesture-controlled PlayStation exists only in prototype form, Sony hopes to have it on the market by early 1998.

The first attempts to capture gestures used a glove, wired up with sensors to detect the orientations of the hand and fingers. First developed in the late seventies at the University of Illinois, the "dataglove" became commercially available in 1980. It used optical fibres to measure finger bending and an electromagnetic sensing system for hand orientation. The "datasuit" followed, essentially a pair of instrumented long-johns which allowed the positions of all the user's limbs to be tracked.

But datagloves and datasuits come with a drawback. Because they have to be worn on the body and connected to computers with wires or, more recently, radio links, these devices encumber the user and hinder free expression. The ultimate gestural interface, if it is to succeed, must leave the user unencumbered.

Although work on unencumbered gestural interfaces is only recently making news, its gestation period goes back to the late sixties. Artist and VR pioneer Myron Krueger invented the idea in 1985 with his "Videoplace" installation, in which a participant faces a large video



projection screen. Beneath the screen is a camera which records the participant's moving image, processed in real time to extract a silhouette which is then displayed on the screen. Other computer-generated images can also be displayed on the screen, and the system can detect interactions between parts of the participant's silhouette and the other on-screen graphics. Krueger later extended the idea to create a "Videodesk", which allows users to interact with word-processing and drawing programs using hand and finger movements.

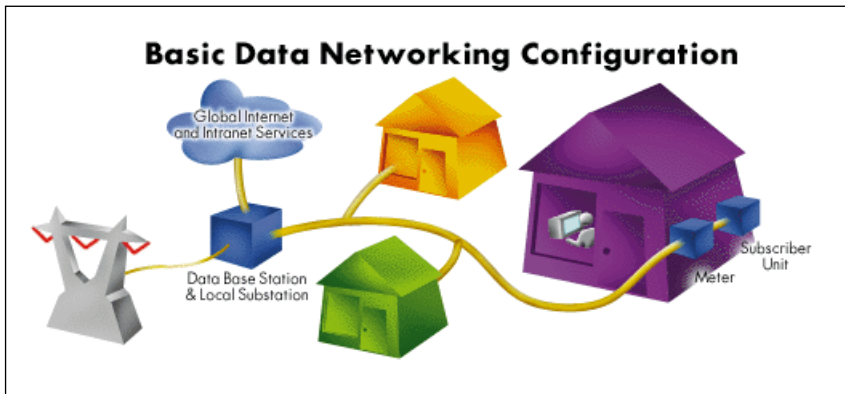
Gestural interfaces also hold huge potential for manipulating 3D graphics. While it's possible to use a conventional mouse to navigate through a scene or manipulate the objects within it, it's always awkward. At SIGGRAPH, ATR Telecommunications Research Laboratories <[www.mic.atr.co.jp](http://www.mic.atr.co.jp)> was demonstrating its multiple-camera approach to recognising palm orientations and finger bending. An operator can control virtual objects in a 3D space, selecting an object by pointing at it and flexing their hands to change its shape.

With the news that future versions of Netscape Communicator and MS Internet Explorer will have VRML display and interaction capabilities, consumers will soon demand better interfaces to 3D graphics, and gesture recognition offers a solution. General Reality Company has announced a wireless dataglove together with Java software for platform-independent gestural control of 3D applications over the internet <[www.GenReality.com](http://www.GenReality.com)>.

Only time will tell if gestural interfaces will take off. I hope they will: next time your PC freezes up or crashes, wouldn't it be wonderful to make a gesture to it, knowing that for once it understands exactly what you mean? ■

**With the growth of gestural interfaces, our bodies could soon control our PCs. It will give a whole new meaning to the hands-on approach...**

# Our friends **electric**



Adam Evans examines plans to use the national electricity grid to transmit data. It's a cheap solution which could become the main way we send and receive information across the net in the coming years.

The new power-line technology acts like a gigantic Local Area Network

**A**s we reported last month in *Internet News*, Nortel and Norweb have signed an agreement to exploit the potential of the national electricity grid for transmitting data. Trials of this new technology have been taking place in Manchester and volume delivery of the product is due to begin in April 1998.

The basic idea behind power-line transmission is refreshingly simple. Equipment is installed at an electricity substation and in the homes that are linked to it. This forms an enormous LAN (Local Area Network), linked to the internet backbone at the substation via standard fibre-optic technology. As with the LAN in your office, this new technology is "always on", meaning that you can start transmitting data immediately without having to dial up a connection.

The equipment at the substation is connected to the low-voltage (240v) power lines and sends radio signals down the grid to a data conversion box in a home or office. This box is installed on the power line just before the electricity meter, with an output for connecting to a PC or other device. Nortel plans to offer a choice of USB or ethernet connection for a computer to receive and send data over the power lines. This means that recently-built PCs should be able to connect without any additional hardware, not even a modem, while older computers will need an inexpensive ethernet card.

The biggest problem Nortel faced was that of electrical interference on the host power line. The solution took three years of research at its European Research and Development Laboratory in Harlow, and Nortel can now send radio signals down the lines with a range of about 300m. This distance is the major limiting factor in power-line technology and is one of the reasons that the first products are aimed at urban environments in Europe and Asia Pacific. An urban substation in the UK serves roughly 200 locations, all within the critical 300m range. Rural areas will miss out on the first phase of power-line technology, but it's possible that future products will be able to extend the range of data transmission.

The maximum transfer rate over a power line is 1Mbit (megabit) in both directions, nearly 20 times the

bandwidth of ISDN. This large bandwidth has to be shared by all the computers served by a single substation. Given that 200 users could, theoretically, be surfing the internet at the same time, you might think that each connection would slow to 0.5 percent of the maximum speed. However, the LAN setup means that bandwidth is used only when actively downloading or uploading data. Nortel predicts that actual data speeds will vary between 500Kbits/sec and 1Mbit/sec.

Power-line technology is not the fastest broadband solution around but it is one of the cheapest. Compared to launching satellites or circling high-altitude planes, the investment costs for the electricity companies are low. Nortel claims that the cost to an operator will be between a third to half of that for ISDN, although how this reflects in the cost to the consumer remains to be seen. Another advantage over some broadband technologies is the equally quick data upload speed from a PC to the internet.

Every urban home and office in the UK is served by an electricity substation with the potential to use power-line technology. Given the right investment and pricing policies (many people are predicting a flat-rate subscription) this could become the primary method for accessing the internet in just a few years. Norweb alone owns around 5,000 substations, most of which will be good candidates for this new technology when it launches in April.

The installation of power-line equipment in homes will have to be carried out by the electricity companies. Roy Williams, project leader at Nortel, believes that they will inevitably move towards becoming ISPs. The other options are for the electricity companies to work in partnership with existing ISPs or for power-line access to be opened up to any ISPs that want it, as with the present telephone network, to avoid a potential near-monopoly by the power companies.

Peter Dudley, vice president of Nortel, claims: "This new technology will unleash the next wave of net growth." The computing world is full of grandiose predictions and hyperbole, but this is one vision that could well materialise. ■

# Hands On Contents

■ *Hands On* is the place where readers can contribute to *PCW* and, as always, we'll pay for anything we use. Macros, sections of code, and hints and tips will be rewarded with a £20 book or record token (please say which you would prefer) and we will pay hard cash for longer, more involved pieces. Please include relevant screenshots in .GIF format. All submissions should be emailed to the author of the appropriate column or snailmailed to Hands On, Personal Computer World Editorial, VNU House, 32-34 Broadwick Street, London W1A 2HG. Questions and short hints and tips can be faxed on 0171 316 9313. We are constantly working to improve the contents of Hands On. If you have any suggestions, send them to the Editor at the address above, or email them to [pcw@vnu.co.uk](mailto:pcw@vnu.co.uk).

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Remember, you saw it here first — that tip, trick, advice or review. And you can find it again: there's a whole year's worth of Hands On columns on our monthly CD-ROM. So if you've got a problem, or if that handy hint is on the tip of your tongue, our cover CD has the answer.



# A **class** act

Become a Delphi power programmer by creating your own custom objects. It's all done with classes, as Tim Anderson explains in the third part of our hands-on workshop.

**M**any newcomers to Delphi are already familiar with Visual Basic. This is a mixed blessing. Delphi's visual form designer is similar to VB, but other features are very different. An example is programming with classes, which in Visual Basic has the feel of an optional extra. In Delphi, classes are fundamental and it is vital to understand them. Once you figure out how to use custom objects in Delphi, your programming ability takes a major leap forward.

The first thing to grasp is how classes relate to objects. A class is a definition of an object, but it is not an object itself. To create a custom object, you need to define its class and then create an instance of the object. For example, reader Phil Whelan has written with a query: "I've just started to use Delphi, and it was going okay until I tried to use variables in a class which I define. It causes a run-time general protection error, every time I try to refer to my class variables."

Phil has not sent in his code, but here is an example that would produce this error. Start a Delphi project and add the code in Listing 1 after the Uses clause in Unit1. Next, in the Implementation section, add

the code in Listing 2.

This class has just one method, which shows its classname. See the tips panel (page 241) for an explanation of the Self keyword. Next, add a button to the form, and in its click event put the following code:

```
var
  MyObject: TMyClass;

begin
  MyObject.ShowClass; {causes error}
end;
```

This compiles just fine, but run it and you

get a General Protection Fault (Fig 1). The reason is that when the ShowClass method is called, MyObject does not exist. Technically, it is a pointer variable that does not contain a valid memory address.

To fix the problem, you have to create an instance of the object and then call the method. Here is the fixed version:

```
var
  MyObject: TMyClass;

begin
  MyObject := TMyClass.create;
  MyObject.ShowClass;
```

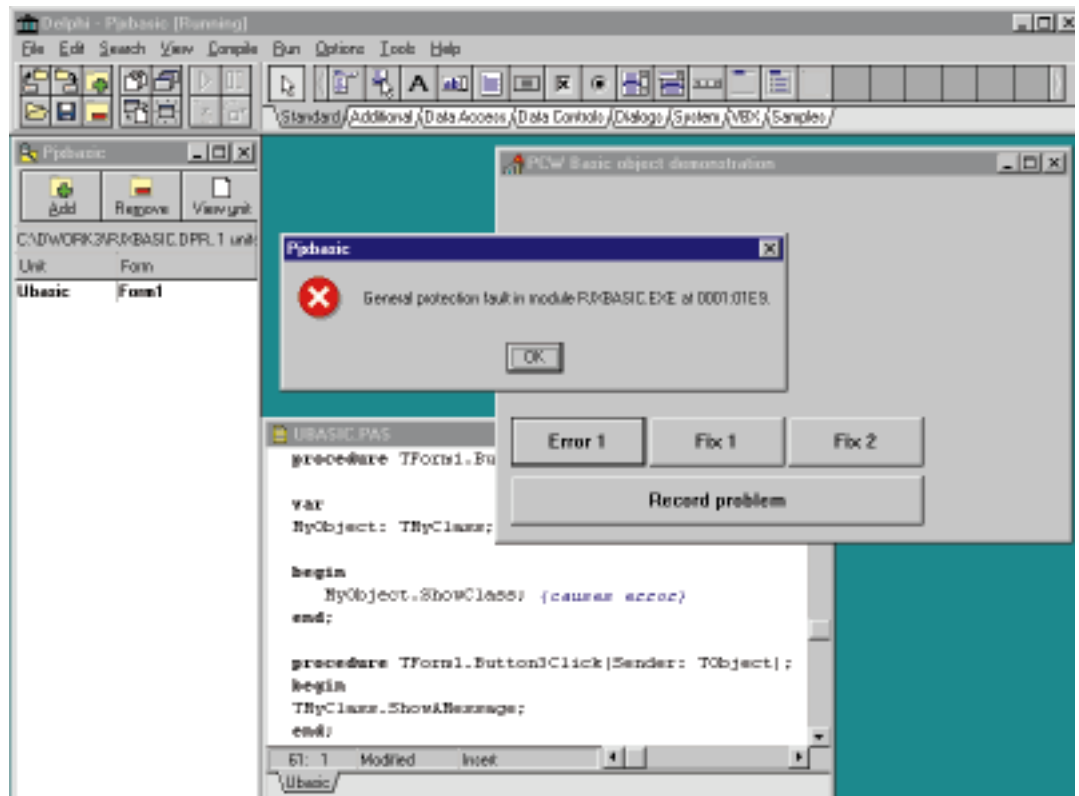


Fig 1 Using an object that has not been instantiated causes this classic Delphi error

```
MyObject.free;
end;
```

Generally, you should never call a method without first creating an instance of the object. Note that you should always free the objects you create (see Tips box, page 241).

There is a way to call class methods without creating an object, and I mention it here for the sake of completeness. If you declare a method with the class keyword, then you can call it directly. For example, you could add this method to TMyClass:

```
class procedure ShowAMessage;
```

and implement it as in Listing 3.

Now you can call TMyClass.ShowAMessage in your code without raising an error. Although it can be handy, this is not something you will want to do very often. The example code for this is on the cover CD, in the project PJBASIC.DPR.

### Claiming your inheritance

One of the great things about using classes is inheritance, which lets you create a hierarchy of classes, with each one benefiting from all the functionality of its ancestors. (The Delphi component library, called the VCL, makes tremendous use of inheritance to achieve its results.) Although it can simplify your code, inheritance concepts like virtual or overridden methods can seem mysterious to the average Visual Basic developer. They are not described all that well in the Delphi manuals, so here is an explanation and an example. The example code is in the project called PJXINRT.DPR.

Listing 4 is a custom class. The class has a constructor and three methods, two public and one private. The implementation of the class displays messages in a memo control, using the private procedure AddMessage. This shows you exactly what is going on. For example, Listing 5 is the constructor.

The button called "Create a base object" calls these two public methods. You will see the memo control fill with three messages, one from the constructor, called automatically by the Create method, and the other two from each of the public methods. Now try a class that inherits the TMyBase functionality (Listing 6). The constructor looks like Listing 7.

Note that the constructor uses the inherited keyword to call the TMyBase constructor. As a general rule, you will want to begin all your constructors with a call to the inherited create method. In addition,

## Listing 1: Starting a Delphi project

```
type
TMyClass = class(TObject)
procedure ShowClass;
end;
```

## Listing 2: Code for the Implementation section

```
procedure TMyClass.ShowClass;
begin
showmessage(self.classname);
end;
```

## Listing 3: Implementing the class keyword

```
class procedure TMyClass.ShowAMessage;
begin
showmessage('Hello from TMyClass');
end;
```

## Listing 4: Custom class

```
type

TMyBase = class
constructor create;
Procedure ThisIsStatic;
Procedure ThisIsVirtual; virtual;
Private
Procedure AddMessage(sMessage: string);
end;
```

## Listing 5: Constructor

```
constructor TMyBase.Create;
begin
inherited create;
form1.memo1.clear;
self.AddMessage('Base class create method runs');
end;
```

## Listing 6: Class with TMyBase

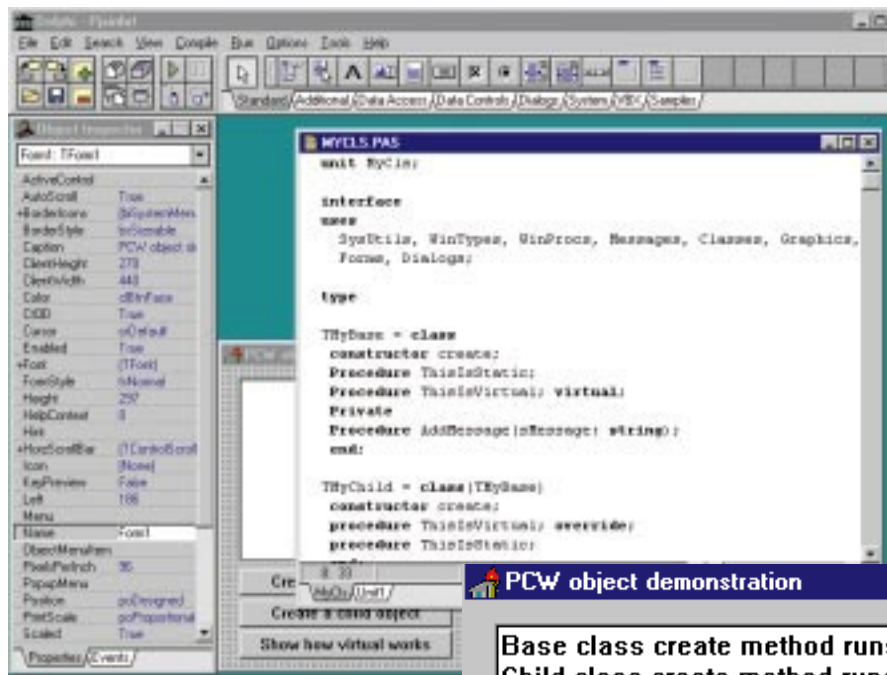
```
TMyChild = class(TMyBase)
constructor create;
procedure ThisIsVirtual; override;
procedure ThisIsStatic;
end;
```

## Listing 7: New constructor

```
constructor TMyChild.create;
begin
inherited create;
self.AddMessage('Child class create method runs');
end;
```

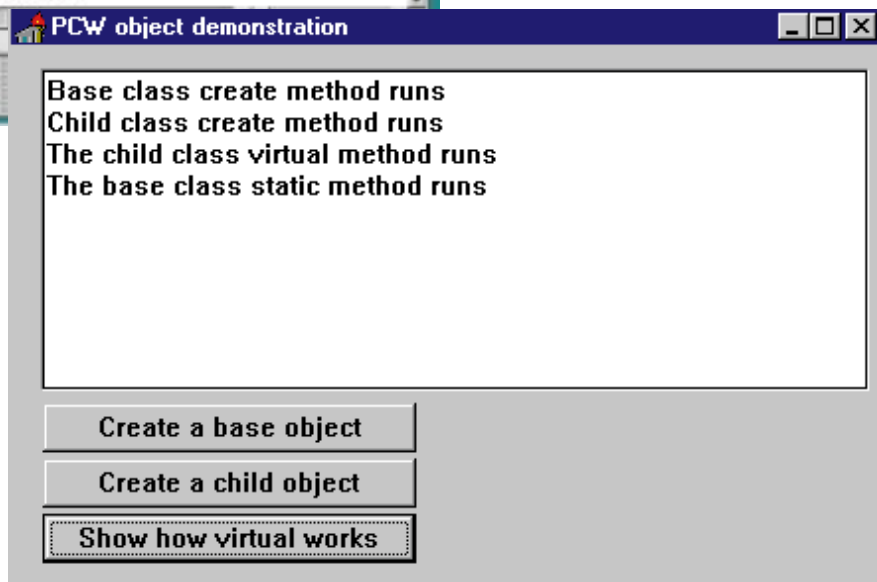
TMyChild implements its own versions of the two public methods. You do not have to

do this. If you want exactly the same functionality, then you can omit the methods



**Fig 2 (left)** You can define classes in the same units used for forms, but it is neater to store them in separate units. Select New unit from the File menu to add a unit to the project

**Fig 3 (below)** This application demonstrates use of the override keyword. This shows the result of clicking the button "Show how virtual works". Delphi calls the overridden method correctly, but can only use the original version of the static method



from the declaration and implementation of TMyChild, and it will use the versions defined by TMyBase. For example, Listing 8 is one of MyChild's methods.

Note that this calls `self.AddMessage`, although `AddMessage` is not defined by TMyChild. It works by using the inherited `AddMessage` method in TMyBase.

So why does TMyChild define its own versions of `ThisIsVirtual` and `ThisIsStatic`? The technique is called polymorphism. It lets you define custom behaviour for an object, while keeping its interface the same. Very often, this is exactly what you want to do. For example, say you had a TPerson object with properties like

### Listing 8: MyChild method

```
procedure TMyChild.ThisIsVirtual;
begin
  self.AddMessage('The child class virtual method runs');
end;
```

Surname, Address, and Sex, properties common to all persons. You might create two child classes, TClient and TStaffMember, which inherit from TPerson. Now you decide to have a Save method which stores the object's data in a database table.

In your code, you want to do this by writing `MyClient.Save` or `MyStaffMember.Save`. The difficulty is that client details are in a database table called CLIENTS, and staff details in a table called STAFF. They may have different fields as well. By defining different Save methods for each class, but

keeping the name the same, you can implement the function as you want. Once

you have done that, you do not need to worry any more about where the data gets saved. You can simply call

the save method.

In the tutorial example, when you click the button called `Create a child object`, the following code runs:

```
var
  mychild: TMyChild;
begin
  mychild := TMyChild.create;
  mychild.ThisIsStatic;
  Mychild.ThisIsVirtual;
  mychild.free;
```

You will see messages showing when the two mychild methods are called. One of the methods is defined in TMyBase using

the virtual keyword, and declared in TMyChild using the override keyword. The other is not. Both seem to work in just the same way, so you may wonder if there is really any difference.

### What override does

To see the difference, look at the `DoSomething` procedure. Listing 9 is the code. Here is a procedure which takes a TMyBase object as a parameter. Then it calls its two public methods. This gets interesting when you run the code under the button called `Show how virtual works`:

```
var
  myChild: TMyChild;

begin
  myChild := TMyChild.create;
  DoSomething(myChild);
  mychild.free;
end;
```

This code passes a TMyChild object to a

## Delphi Tips: object of the exercise

### ■ Freeing the object

If you create an object in your code, you should free it as well. You do not need to worry about objects like forms and buttons which Delphi creates automatically, since these will also be freed automatically. If you create a form in code, though, you should explicitly free it.

One of the snags here is that if you call the free method on an object which has already been freed, Delphi raises an error. This can happen if there are several exit points in a section of your code. You might decide to place code for freeing an object in several places to ensure that it always gets called. That may mean there is a path through the code that does the job twice, so causing an error.

The solution is to go one step further. When you free an object, set it to nil as well, like this:

```
MyObject.free;
MyObject := nil;
```

You can call the free method on an object that has been set to nil without an error.

This is also handy the other way round. Perhaps you have some code that refers to an object, and there are circumstances in which it might be called before the object is instantiated. Add some start-up code to the application, and set all your custom object variables to nil. Then you can check whether the object is instantiated like this:

```
If MyObject <> nil then
{. . . do something with MyObject}
This only works if you remember to specifically set the object to nil in your code, otherwise you will still get an error. Of course, a better solution is to design your application so well that this kind of defensive programming is not
```

necessary. In the real world, though, a little pragmatism often helps.

### ■ Using self

The self keyword is a vital part of object-orientated programming. It means "the current instance of the object". Imagine that you have a customer object with a SendFax method. The method sends a fax to the customer, looking up the fax number from a FaxNumber field. Within this method, you can get at the field with self.FaxNumber. The advantage is that if there are several customer objects instantiated, the self keyword ensures that you are referring to the right FaxNumber field or property. I have seen some strange Delphi bugs solved by use of the self keyword. It is also short and easy to type, so make good use of it.

### ■ Objects versus records

A confusing aspect of Delphi is that Borland's naming scheme does not distinguish between objects and other types. All begin with T, so for example TFont is an object type,

TFontName is a string type, and TLogFont is a record type. The distinction between records and objects is particularly confusing at first. Records have fields, but not methods, constructors or destructors. When you declare a record type, Delphi immediately allocates memory for it, whereas when you declare an object, Delphi only creates the equivalent of a pointer variable. That means you can just get on and use a record variable, whereas objects must first be instantiated with Create.

There is a problem, though. When you declare a record, Delphi does not necessarily initialise its fields to sensible defaults. The example project on the cover CD defines the record in Listing 10. Then, it is used like in Listing 11. Oops! Whereas you might expect to see zero, in fact Delphi puts any old number into the integer field (Fig 4). This can cause major problems. The answer is to initialise the fields of a record type before you use them. It demonstrates the advantage of using objects, where initialisation code can be properly encapsulated into the constructor.

### Listing 10: Defining the record

```
type
  TMyRecord = record
    field1: string;
    field2: integer;
  end;
```

### Listing 11: The record in use

```
var
  myRecord: TMyRecord;
begin
  showmessage (inttostr(myRecord.field2)); {get a random number!}
end;
```



**Fig 4** When you use a record type variable, you must initialise its values. Otherwise you get random results like this one

procedure which expects a TMyBase parameter. No problem. Because everything in TMyBase is inherited by TMyChild, Delphi accepts the parameter. When the two methods are called, though, note the difference. The virtual method runs the code

defined in TMyChild, but the static method runs the code defined in TMyBase (Fig 3, p240). Just for fun, try removing the override keyword from the procedure definition for TMyChild. Now neither child method gets called.

Then try adding the override keyword to the **ThisIsStatic** definition. Delphi reports an error: "cannot override a static method". The rule is, if you want to override a method, it must be declared as virtual. Using the dynamic keyword has a similar effect.

What if code in the parent class calls a method that you have redefined in the child class? The override keyword makes all the difference. If you use it, Delphi is smart enough to call the redefined method. If you do not, the parent class method is called.

### Listing 9: DoSomething

```
procedure DoSomething(thisobj: TMyBase);
begin
  thisobj.ThisIsVirtual;
  thisobj.ThisIsStatic;
end;
```

■ Thanks to all of you who have sent email with Delphi comments and queries. It's great to see the tutorial being so widely used.

### PCW Contact

Delphi queries are regularly tackled in *Hands On Visual Programming*. You can contact **Tim Anderson** with your queries and tips at the usual PCW address (p12) or at [visual@pcw.vnu.co.uk](mailto:visual@pcw.vnu.co.uk)





# Standard issue

How is your information posted on the net? It should be in a standard form that *everyone* can view — Nigel Whitfield stirs it up. And, see how you can automatically update your HTML pages.

**T**here's an old maxim in some of the more technical newsgroups on the internet, about standards: "Be strict in what you give out and liberal in what you accept." In the rush to make the net a more friendly place, it seems some people have forgotten this, and the results can range from irritating to just plain stupid.

IRC, for instance, is supposed to be a place where people can chat, and with the exception of the ability to send files to other users, it's essentially a text-based system. It's rather irritating, though, when users of some software decide they want to use different colours and the result for others is white text on a white background, or lots of peculiar brackets all over the place.

More incongruous are the effects of Microsoft's Comic Chat, which attempts to turn IRC into a comic strip: all well and good for those using the same program, but it's unsettling, to say the least, when messages like "Butch appears as ANNA" pop up on your screen, let alone all the other garbage added by the system.

Email is affected, too. Those who decide to send questions as a Word for Windows attachment will find them deleted without even having been read. This happens when I read my mail on a Unix system or via the web from a café. Worse still is the gibberish attached to some messages by programs like Exchange, with attachments buried in the middle of information, about which fonts are used.

The net needs facilities to liven up chat rooms, add sparkle to web pages and allow fonts and emphasis in email messages. The trick is to make sure it can be done without inconveniencing people who, for whatever reasons, don't have the latest software installed on their systems. Surprisingly



**Don't get scrambled, get some sparkle into your web pages and add some oomph to your email**

enough, many of the standards such as MIME have been designed specifically so they will work without inconveniencing people who don't have enhanced systems, or so that alternatives can be provided on

web pages, allowing quick access when you don't want to see all the pictures, or speech synthesisers to read out something more useful than "image image image" for a menu.

The technology is there, but long-time

p252 >

## Listing 1: Redirecting visitors

```
<HTML>
<HEAD>
<META HTTP-EQUIV=REFRESH CONTENT="15; URL=http://www.myplace.org.uk/">
<TITLE>We've moved!</TITLE>
</HEAD>
<BODY><H1>Our url is now www.myplace.org.uk</H1>
<P>You will be taken there automatically in fifteen seconds</P>
</BODY>
</HTML>
```

computer users may also be familiar with another saying: "Standards are great; everyone has one". The problem arises when people are arrogant enough to assume that if someone doesn't follow their standard, they need to be made to or lose out on part of the information — a route which, some believe, the likes of Microsoft is taking with its steps towards dominance of the web browser market.

Sure, all the bells and whistles are making the net easier to use, and that is welcome; but before you decide to create a web site that relies solely on JavaScript and frames, write all your email in Word and send it as attachments to your messages, or write in coloured text on IRC, stop a moment and think. What are you really trying to do? What is the internet for? Isn't it about communication?

Presentation helps get the message across, but think about the mail that's unreadable when people don't have Word for Windows on their Unix, Mac or Amiga system. Don't fall into the trap of spending so much time on presentation that a sizeable number of net users cannot see your information at all.

### Automatic updating of pages in HTML

Most web pages are, with the exception of those including applets, fairly static things. You visit the page and nothing else happens until you click on a link. The experienced net surfer will have noticed various sites which have a range of clever tricks on them, including the common: "*This page has moved; you'll be taken to the new one in ten seconds*" type of banner, or a page which includes a picture, updated periodically.

How do they do that? The answer varies, but without having to worry about learning Java or other techniques, there are two ways in which you can achieve this sort of effect: client pull and server push. Client pull is the simplest way of updating a

web page and is supported by rather more browsers than server push. As the name suggests, its operation is down to the web browser rather than the software, which means it's possible to use the technique whatever the type of server on which your pages are hosted — even the free space given out by many service providers.

### Tricks and things

There are things you can do with client pull, especially if you combine it with tricks like the Server Side Includes (which were covered in last month's column) or with other scripting elements. You could use an included script to provide the latest value from a database or some other source of information, and create a page that updates itself every few seconds, giving real-time information.

Setting up a client push is simple — all it takes is a single line in your web page, which needs to appear in the HEAD section rather than the body text. The simplest form, which will make your page reload every five seconds, is a line like this:

```
<META HTTP-EQUIV=REFRESH CONTENT="5">
```

The Refresh command is a standard part of the http response that a server can return, and the value 5 is the number of seconds to wait before fetching the page again. If you set it to zero, the page will be reloaded as soon as the client is able. Adding a separate link to the page will allow people to click on that to go elsewhere, before the page is refreshed.

What if you want to load another page? That's simple, too, and you could use it to create a "slideshow" effect or simply to redirect people to a new location for your page after a number of seconds have elapsed. All you need to remember is that you must specify the full location of the page to which you want people taken: you can't give a relative reference, like you would in the rest of your site. So, to redirect people

to the site [www.myplace.org.uk](http://www.myplace.org.uk), you'd use HTML like the example in [Listing 1](#).

Client pull is a simple technique, although it's not always the best way to do things. Another way of creating pages which update automatically, without having to do more than a simple script, is server push.

In this technique, the web server carries on sending information back to your browser, using a special MIME type called multipart/x-mixed-replace. Be warned, though, that not all web browsers understand this type of information, and it can even cause some versions of Microsoft Internet Explorer to crash completely.

#### Polite request

Nevertheless, when it works it's very useful. You can, for instance, display a page that states "Please wait while we retrieve the information you requested" and have it automatically updated when the server has assembled everything that's needed for the next page. Or you could use a script that generates this type of information to send images to the web browser, giving another way to create a slideshow effect.

The key to server push is the script you write and the headers it sends back to your web browser. As long as the user doesn't

press the Stop button on the browser or go to another location, the script can continue sending new data. If you write the script in a language like Perl, you don't need to worry about what happens when the connection is closed: it will be taken care of for you.

As well as the initial header specifying the multipart/x-mixed-replace format, you need to decide on a string that will separate the different pages, which shouldn't appear in the pages themselves. Once done, it's pretty simple to create a series of pages

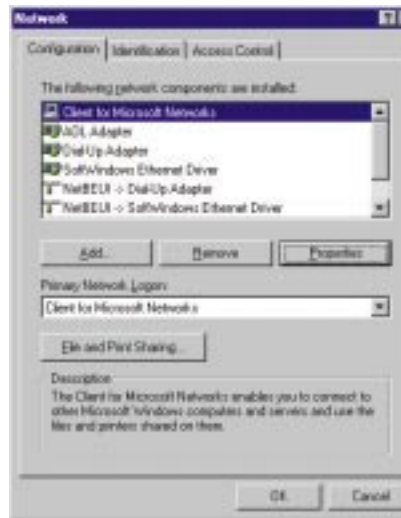
which updates. The Perl script sends out three pages in succession. Each one could contain extra information created by the script, rather than the simple example here; for clarity, the <HEAD> and other essential HTML parts for each page have been omitted from the code in [Listing 2](#).

You can use this for images, by specifying the image as a script which sends successive gifs back to the browser. However, this isn't likely to be efficient and, with modern browsers, you'll be best off using animated gifs instead. **p254** ➤

### Listing 2: Page separation

```
print "Content-Type: multipart/x-mixed-replace;boundary=AUniqueSeparator\n\n" ;
print "AUniqueSeparator\nContent-Type: text/html\n\n" ;
print "<H1>This is the first page of the show</H1>\n" ;
.
.
.
print "More in 20 seconds...\n" ;
sleep 20 ;
print "AUniqueSeparator\nContent-Type: text/html\n\n" ;
print "<H1>Here's page 2</H1>\n" ;
.
.
.
print "AUniqueSeparator\nContent-Type: text/html\n\n" ;
print "<H1>And this is the final page</H1>\n" ;
.
.
.
print "AUniqueSeparator\n" ;
exit ;
```

## Questions & Answers



You can have a LAN and an internet connection, if you first set things up properly

**Q** We want more than one email address and unlimited net access. Unfortunately, BT's technical support line tells me that if we sign up for BT's service (our first choice for long-term stability), their software will disable any LAN connection for that PC. As we want to link our two PCs with a simple network based on WF3.11 & W95, this is a major stumbling block. BT is unable to explain why this is.

Can you throw any light on it, and advise us whether we will hit this problem with any ISP?

**A** The most likely explanation for the problem is that BT's helpline would rather tell you that something can't be done than run the risk of telling you that it can, and then having to deal with your calls when things go wrong.

You can have a connection to your network and to the internet running on the same machine. Things become complex when you want to run the same protocol on both the network and the internet. You'd have to ensure that you configured both machines with TCP/IP addresses which were valid for private networks, and set the internet properties to use the dial-up link to BT Internet as the default connection.

However, if all you want to do is share files and printers between the two machines, the solution is much simpler: don't install TCP/IP on both machines.

Use the Windows 95 system to connect to the internet, preferably using the built-in dial-up networking. BT's helpline should be able to tell you how to set that up.

On the LAN side use NETBEUI to connect the systems, which is the built-in networking for Windows and can be set up without having to install any other software on Windows for Workgroups.

To make things work smoothly on the Windows 95 system, open the Networks control panel and you'll see two adapters—the network card and the Dial-Up Adapter. Highlight each in turn and click on the Properties button, then choose the Bindings tab.

Ensure that TCP/IP is using only the Dial-Up adapter, and that NETBEUI is restricted to the network card. When you've made your changes you'll be asked to restart the computer, and you should be able to access both the internet and the local network without any problems.

An alternative is to set up the local network and then install internet access software such as Turnpike, which includes its own TCP/IP software that won't interfere with the connection to your LAN.

**Q** I use a Mac for web design, but the rest of the network uses Windows systems running TCP/IP. Is there a simple way that I can connect to drives on the Windows boxes, so I can save web pages directly to the server?

**A** There are a number of solutions. If you don't mind messing about a bit, you could use an ftp program like Fetch on the Mac, combined with an ftp server on one of the Windows systems and transfer your pages over the net when they're finished. However, if you just want to be able to save files directly to a Windows hard disk, perhaps the best solution is the commercial product DAVE, from Thursby Software at [www.thursby.com](http://www.thursby.com). DAVE is a NetBIOS client for the Mac which works over TCP/IP so you can mount shared Windows drives on your LAN or over the net. A demo copy can be downloaded from the site, and version 2, due for release this month, will allow Mac users to share their own drives and printers with Windows systems.

## Questions & Answers (cont'd)



**DAVE** is a solution that lets Mac users attach to shared PC drives on a Windows network

**Q** Having installed the Demon software, I find that I can no longer access the internet using AOL. Why?

**A** Why do you want to access the internet via AOL? Unless you're planning to go abroad and use AOL's international access numbers, you'd be best off using Demon for your net access.

You can configure AOL to connect over the internet, enabling you to dial into Demon and run AOL as just another net app, with things like Explorer and mIRC.

If you decide you want to be able to access the net via AOL, the best solution is probably to re-install the AOL software. Make sure you load the correct version for your Windows system and install over the top of your existing config: all your mail messages and preferences will be saved

and transferred. If you're using Win95 with an old version of AOL, you should upgrade.

If you install any other internet software, you should make sure that it doesn't overwrite any of the Winsock files in your Windows\System directory. Keep copies of the Winsock and Wsock32 DLL files in a safe directory so that they can be replaced if necessary. The best solution for Win95 users is to use Dial Up Networking to connect to

true ISPs like Demon, which allows Windows to handle the different configurations, and to install AOL in its own directory with its own software.

**Q** Is it true that when you visit Microsoft's web site, it trawls through your machine and notes what software you have and where you've been surfing?

**A** No, it's a myth. There have been similar stories circulating since the introduction of online registration in Windows 95, and claims that Microsoft was checking to see if you had any illegal software installed on your system. With the advent of ActiveX controls it is, of course, possible for a site to scan your whole system, or indeed do

far worse things, but no reputable site is likely to carry out such a survey. Even if Microsoft were to check what software is on your computer, it's hard to identify people who are accessing the site from many ISPs because you're allocated a different internet address each time you connect to the system. Also, this type of data collection is likely to fall foul of data protection legislation around the world.



**AOL** can co-exist with other internet software provided that you set things up carefully

### PCW Contact

**Nigel Whitfield** is a freelance journalist, maintainer of several internet mailing lists and consultant to a number of non-profit organisations. He can be contacted via [internet@pcw.co.uk](mailto:internet@pcw.co.uk)



# The waiting game

Tim Nott continues the theme of what to do if Win95 fails to tell you when it's safe to switch off your PC. Delving into the file system and upper memory could help you solve the problem.

**W**here were we... Oh yes, waiting for our computers to shut down. Last month we looked at the more accessible reasons for this, ranging from damaged exit sound files to something nasty in the virtual device drivers.

This month, we plunge headlong into the fascinating world of the file system and upper memory. (If you're already nodding off, then skip to the section headed "Completing the set", page 256, for the familiar blend of tips and trivia.)

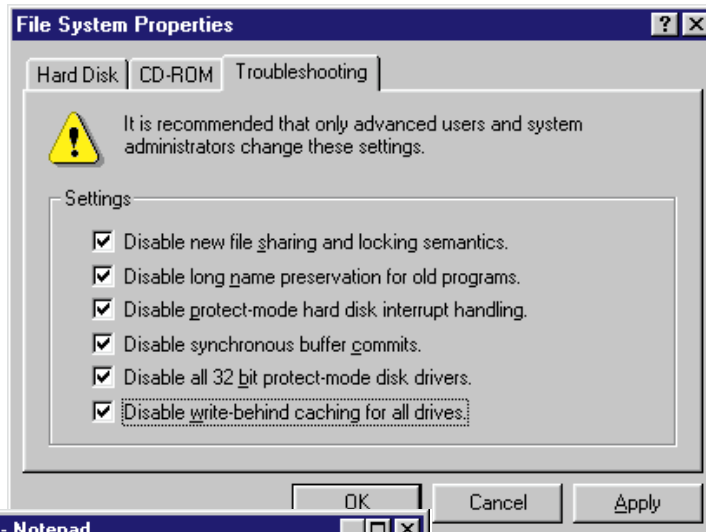
A further, sound-related possibility is a conflict arising from using the PC's internal speaker. If the line

```
wave = speaker.drv
```

appears in the [drivers] section of SYSTEM.INI, try disabling it with a semicolon at the start of the line.

Another possible but uncommon reason is Advanced Power Management on some portables. If the BIOS is set to suspend rather than shut down, Windows can't exit. The proper cure is a BIOS update, but you can work around the problem by disabling APM from the Device Manager. Expand the System Device branch, double-click the APM entry and disable it from the Settings tab.

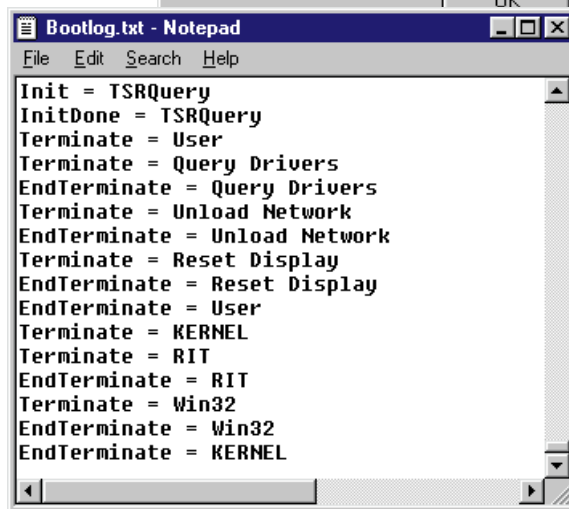
The next suspect is the File System and now it all starts to get rather heavy, so a Registry backup is in order — see the Q&A box on page 256 for the best way to do this. You have of course an emergency boot disk complete with real-mode CD-ROM drivers already prepared. Back in



**Left** Hunting out shut-down problems with the file system

**Below, left** What a well-behaved shut-down should look like in the boot log

the "Disable all 32-bit protect-mode disk drivers" first, to get



your CD-ROM drive back.

If the problem still persists, it could be a device driver problem. Restart the PC, press F8 to get the startup options, then 2 to create a log. Windows will take longer to start and you should then shut down and restart again. Examine the end of the Bootlog.txt file in C:\. You should see a set of Terminate statements, each matched by an EndTerminate one, and the final line should read

```
EndTerminate = KERNEL
```

If it doesn't, then the last unmatched Terminate entry should provide a clue, as follows:

- Query Drivers** Possible memory management problem. Are you running QEMM?
- Unload Network** Possible conflict with network drivers in CONFIG.SYS.
- RIT** Possible problem with a sound card or mouse driver.
- Win32** A 32-bit program is not closing. Microsoft Visual C++ is, apparently, a known offender.

Control Panel, System Properties, turn to the Performance tab, hit the File System button and then the Troubleshooting tab. Tick all the boxes and shut down Windows.

Note that you'll temporarily lose access to your CD-ROM drive unless you have real-mode drivers loaded in CONFIG.SYS and AUTOEXEC.BAT. If this cures the problem, reinstate the options one by one: uncheck

## Questions & Answers

**Q** I created an icon using Paintbrush [see *November's column*] and attached it to a Desktop shortcut. I then realised that it looked wrong against the background so I edited the icon and resaved it, but could not get the shortcut to show the new version.

If I saved the edited icon under a new name, then changed the shortcut to use this, it worked. However, I wanted to keep the icon name so I deleted the first icon, temporarily connected the shortcut to a different icon, then renamed the edited version to the original icon name. Trying to use this for the shortcut reverted to the original, unedited version, which is no longer on my hard disk. I am very confused and frustrated.

Paul Edwards

**A** He's right, you know. I've just tried it, and were there a twist in the immediate vicinity, I would have been driven round it. What's even more frustrating is that you can see the edited icon in the shortcut properties but it still won't change the shortcut itself.

The problem arises because Windows maintains an icon cache: rather than shoot off and fetch icons from every corner of your hard disk, it keeps them in a central file, saving time. However, the cache isn't smart enough to realise an icon file has changed (if MYICON.ICO is in its books, it will continue to use the original version) with the frustrating results as related above.

TweakUI (part of the free MS Powertoys, and an essential Windows add-on) has a Repair tab with a button to update the cache and fix the problem. Alternatively, if you don't have TweakUI, you can rebuild the cache as follows:

1. Right click on the Desktop — select Properties.
2. Go to the Appearance tab.
3. Scroll through the Item list to Icon.
4. Increase the size by one point, then hit Apply. You should see the icon update.

5. Decrease back down, and Apply again, then OK out.

**Q** Can I manually convert Win3.x groups to equivalent groups on the Windows 95 Start Menu?

Knut Jespersen

**A** Yes. Just double-click on the .GRP files.

**Q** I'm sure right-clicking on .INF files used to give an Install option: I remember doing this with the Powertoys. But it doesn't any more...

Stephen Geary

**A** You're right, the Install option should be there because the .INF filetype is reserved for Setup Information files. Fortunately, if you've installed the Powertoys you should have TweakUI. Go to the Repair tab and hit the Repair Associations button.

If you prefer to get your hands dirty, you can open any folder (or Explorer) and from the View menu, select Options then the File Types tab. Scroll down to Setup Information in the list. If it doesn't exist, you will have to create it: click New Type and put Setup Information in the Description... box and .INF in the Associated Extension box.

Next, click the New button to create an action. In the upper Action box type "&Install". Do not include the quotes for any of this, but the ampersand (&) enables the keyboard shortcut (underlined in the menu). In the "Application used..." space, type (all on one line):

```
C:\WINDOWS\rundll.exe setupx.dll,
InstallHinfSection DefaultInstall
132
```

Note that there are spaces after "exe", "Section" and "DefaultInstall".

OK out, and the new Action will appear in the list of the previous dialog. You can also create an Open action that uses C:\Windows\notepad.exe. Having created the latter, highlight it in the list and click the Default button.

The Open entry will then appear bold,

and will be the action that happens when you double-click an INF file.

The icon should look like that of Notepad with a small yellow cog. If you need to find this, browse to C:\WINDOWS\SYSTEM\shell32.dll and scroll through the selection.

If you already have a Setup Information file type, then you need to edit the type, then the actions, to ensure the details are as above.

**Q** Back up the Registry: easy to say, and no doubt sound advice. But how?

Nigel Woolf

**A** My preferred method is to use the Emergency Recovery Utility. Copy the ERU folder from the Other\Misc\ folder on the Windows 95 CD-ROM and follow the instructions in ERU.TXT.

Three things worthy of note are that this backs up not just the Registry but other vital files; you can restore from a command-line prompt (unlike the Configuration Backup utility); and although you're encouraged to back up to a floppy, you probably don't have a hope in hell. The files are just too big and ERU will cheerfully ditch those that don't fit. Back up to a separate folder on your hard disk instead.

**Q** I have seen a version of Windows 95 installed on PCs in shops that is missing parts of the Start menu (e.g. Run or Settings). Is there any way to remove default lines in the Start menu or add lines below Programs?

James Sanders

**A** Taking the latter first — not that I know of. The former can be done by direct Registry editing, but it's much easier to use the System Policy editor which we covered in the September 1996 issue. You'll find POLEDIT.EXE on the Windows 95 installation CD-ROM. The resource kit, also on the CD as W95RK.HLP, contains lots of helpful information on system policies and using Poledit.

**Reset Display** Display driver problem, or video shadowing in the BIOS.

Let's look next at memory management. We've already covered disabling drivers loaded in CONFIG.SYS and AUTOEXEC.

BAT, but now we're going to add some. Edit CONFIG.SYS and add the lines in **Listing 1**. If this cures the problem, there's a conflict in upper memory. We've excluded Windows from using all the upper memory

(a000-f7ff) so the next stage is to reduce the excluded range; say, to c000-f7ff. If the problem returns, the conflict is in the a000-bfff range. If not, it's in the c000-f7ff.

In either case, continue narrowing the

### Listing 1: Adding some drivers

```
device = c:\windows\himem.sys
device = c:\windows\emm386.exe noems x=a000-f7ff
```

### Listing 2: A shortcut

```
C:\WINDOWS\SendKeys.exe c:\windows\notepad.sk
```

range; say, to a000-aff. You may be able to narrow this further, but if, say, neither a000-a7ff nor a800-aff work, while a000-aff does, you'll have to include the entire range. Just to make things a little more exciting, you may have to exclude more than one range — e.g. x=c000-c7ff x=e000-efff. But that doesn't bear thinking about, does it?

If that doesn't cure it, you're going to have to remove the two lines from CONFIG.SYS and wait for my next column. I know I said we'd do it in two parts, but as it's exceptionally tedious I'm going to stretch it to three. Next month, we'll conclude with more exciting insights into device drivers and plug-and-play.

#### Completing the set

Last August, we printed the tip on how to change the toolbar background bitmap in Internet Explorer 3. We followed this up in November with changing the spinning globe animation.

By the way, there's a year's worth of searchable Hands On, on the CD-ROM each month. So before you email me saying "A few months ago, I remember you did something on..." have a look there. It will save us all time.

Getting back to the point, Henry Bevan completes the set by changing the IE3 window title. Back up that Registry, fire up Regedit, go to

```
Hkey_Local_Machine\ Software\
Microsoft\ Internet_Explorer\ Main
```

and change the value of "Window Title" to whatever catches your fancy. If there isn't a "Window Title" entry, create it as a new string value.

#### You send me

Now here's a clever bloke. Remember that venerable old chestnut, "How to start Notepad with word-wrap on?" In just 7Kb of Visual Basic executable, Kevin Carbonaro has cracked this problem. His Sendkeys utility does just what the name suggests: it starts an application, then sends keystrokes to it. It

requires a little effort on the part of the user.

First, you will need to create a plain text file containing the path and filename of the application, followed by the keystrokes. So, in the Notepad example, you would have a file called NOTEPAD.SK (the SK extension is not mandatory) that reads:

```
C:\Windows\notepad.exe
&
e
w
```

where the first line launches Notepad and the second corresponds to a "sticky" Alt key which waits for the next key, E. Alt + E (as any fule kno) drops the Edit menu, and W turns on word-wrap.

Having created the text file, you then need to create a shortcut with the full paths to Sendkeys and the file as the target (Listing 2). And that's it. There's no fancy installation routine, and the simplest thing is to unzip everything to your Windows folder.

If you would rather put it elsewhere, you will have to modify the sample shortcuts. Sendkeys.zip contains the program, the Sendkeys.txt file (with full instructions) and samples. You will also need VBRUN300.DLL in your Windows\System folder. If you don't have this, it is on our PCW cover-mounted CD-ROM this month.

### The fax of life

Thank you, Tim Medcalf, for sharing with us the following:

*"I was registering Internet Explorer online. I didn't enter my fax number and ticked the box that indicated that I didn't want Microsoft to fax me for any reason. The next screen showed the message: 'We need your fax number in order to respect your wishes not to receive unsolicited faxes'."*

### PCW Contacts

Email **Tim Nott** at [win95@pcw.co.uk](mailto:win95@pcw.co.uk) or write to him c/o the usual PCW postal address (p12).





# Show your true colours

Panicos Georghiades and Gabriel Jacobs help sort out a problem with colour drivers on a 386 PC, sort out mikes which are taking the mickey and solve the missing icons mystery.

**A** happy new year to you all! Did you treat yourself to a new computer for Christmas? If you didn't, and are still struggling to get your 386 to boldly go where no 386 has gone before, remember that those lucky people who have all the state-of-the-art stuff are struggling with bugs in new software.

One of our readers lucky enough to work on a 386 is Jonathan Waite, who writes: "My old Ambra Sprinta 386 is mostly used by my young children. It was supplied with a 16-colour VGA 640 x 480 driver. Because so many children's games require 256 colours I upgraded with a Microsoft SVGA driver from a PCW cover disk. This is fine for graphics, but it seems to cause a problem if I try to scroll in a list box.

"I can get around the problem by changing to the VGA driver for text work, but it would be nice to be able to use 256 colours for clip-art. (My colour printer is still connected to the Ambra.) Any thoughts?"

The Microsoft SVGA 256-colour driver (Fig 1) is for general use and is supplied in case your own card does not have a specific SVGA driver, or in case you are using a machine (or software) that conflicts with your card's specific SVGA driver.

Our suggestion is to get hold of the SVGA driver for the card that is in your machine: your supplier may be able to help. If you have no luck with your supplier, it is worth opening up the machine and looking at the graphics card — it may be one that is widely used and you can get an updated driver for it from the net. In fact, when your machine boots up, the screen usually displays the graphics card you are using.

Alternatively you can upgrade the graphics card in your machine, and since yours is a 386 it will only take an old-

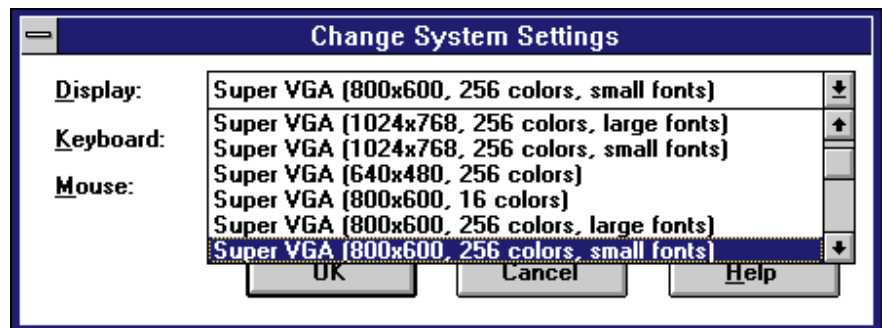


Fig 1 The Microsoft SVGA 256-colour driver is for general use

fashioned card which should not cost you more than £30. In case you need it, and can afford the phone call, we have printed Ambra Technical Support's phone number in the "PCW Contacts" box on page 266.

## Sound sense

Right, we've had colour — now let's have some sound. Better still, let's record it. Alan McArdle writes: "I have an Escom P60 running DOS 6.22 and Windows 3.11 for Workgroups. I have two microphones: a Ross with its own battery, and a Boeder without a battery (I think). So far, neither of them will record anything, either on my Yamaha Station or on the MS-DOS Sound Recorder, yet both will play back existing WAV files.

"I understand from my local independent computer store that it is difficult to install and/or configure a microphone in Windows 3.11, and they will charge me only £25 (ex VAT) if I take in all my hardware except the monitor. But can you please help?"

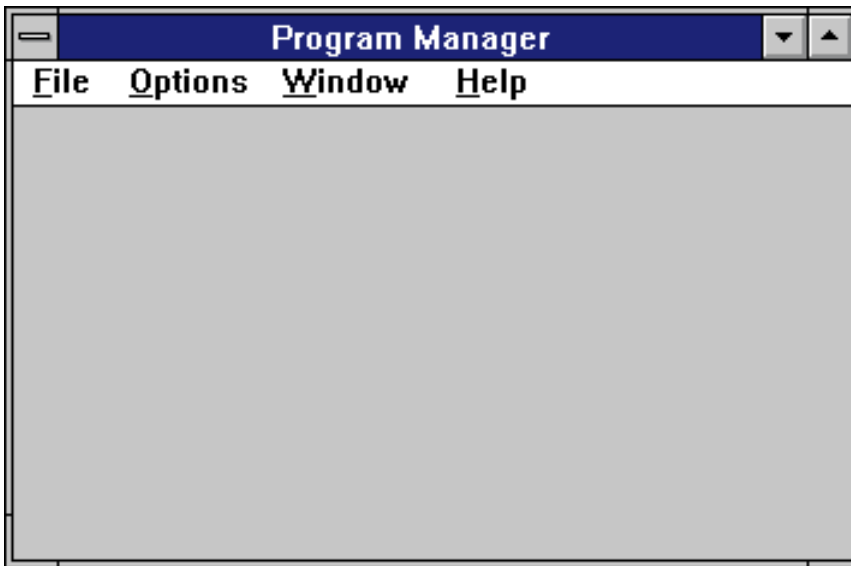
This is a common problem, and for a good reason: we doubt that any PC manufacturer tests this when they assemble a machine. It is not difficult to install and/or configure a microphone in Windows 3.11. Or at least, it shouldn't be.

But £25 (ex VAT) is not a bad deal if your local shop will throw in a new microphone, in case yours do not match your sound card. If one of your microphones came with your sound card, that is the one to use — it should work.

If you do not want to take up the offer, the following will interest you (and others with the same problem). The cause of the problem could be:

1. Wrong microphone for the card.
2. Wrong settings for recording, either in the mixer program or in the installation.
3. Microphone or its cables do not work.
4. Microphone socket on the card does not work, or microphone plugged into the wrong socket.

There are two types of microphone: condenser microphones (otherwise known as electret) which require a battery, and dynamic microphones which do not. You need to look in your sound card's manual to see which one it takes, as it is not likely to take both. While you are studying the card's manual, have a look at what spec is given for ohms (for the mic input). This is likely to be 600ohms but it may be another value; in any case, it should match the value of the microphone. Of course, if one of your microphones came with your card,



**Fig 2** Now you see them, now you don't: have you ever lost your icons?

you do not need to do this.

We will assume that they match. We will additionally assume that you checked the mixer settings on the Yamaha Station and any other program you are using to record (you can also use the Windows Sound Recorder if the level for the microphone is turned up and the microphone is not set to mute).

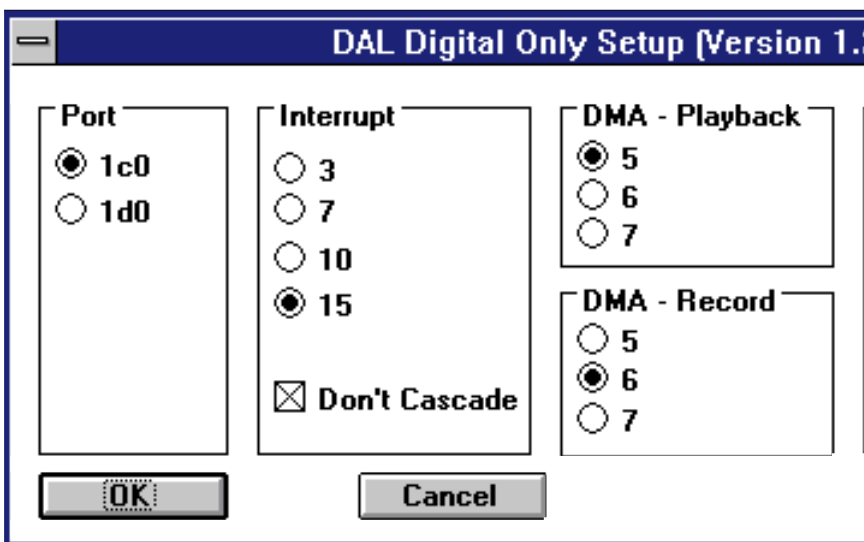
Have you tried recording from any other source, like the CD-ROM drive, the MIDI synthesiser in the card or an external source? If you cannot record from any of these sources either, the problem is likely to be an installation setting for the card, usually an incorrect DMA channel (Fig 3).

You can correct this by using the card's own setup software or going to the Control Panel/Drivers section by clicking on the

sound-card driver (for audio) and changing the settings. If there are a few DMA settings, there are likely to be three or six available, so change the combination. You may need to experiment with these settings and restart Windows for them to take effect. But change them only if you cannot record from other sources either.

Problems may also arise from incorrect interrupts and I/O settings, but these are likely to have more results such as no sound playback or even system crashes.

Failing that, are you using the right socket? Cards usually have two inputs: a microphone (low level) and an Auxiliary-in (high level for use with tape machines, TVs, CDs and other domestic hi-fi equipment). If you plug the microphone into the Auxiliary-in, it won't work.



**Fig 3** DMA channel settings are the ones most likely to cause problems with recording, when everything else works fine

### The strange case of the missing icons

Have you ever started Windows, only to find that all your icons have gone — stolen or apparently on holiday? It happened to Sazid Aziz

<[medusa@ps.cus.umist.ac.uk](mailto:medusa@ps.cus.umist.ac.uk)> who writes:

*"I have a problem under Windows for Workgroups 3.11. The trouble is that in some way, all the icons on the Windows main screen seem to have been deleted. The only icons remaining are those which were there initially, when I bought the computer. The programs are still there and I can use them from the Run option on the main Program Manager screen.*

*"The problem also involves any new applications I install. As soon as I exit the Program Manager into DOS, it disappears, and the icons, too, just seem to disappear.*

*"If it makes any difference, my current system is a Pentium 90, with a 1.1Gb hard drive and 24Mb RAM."*

The information about the icons on the desktop is held in a file called progman.ini and this should reside in your Windows directory. If this file is corrupted, or cannot be found, or cannot be written to, or if one of the restrictions settings in it is set to a certain value (see below) then all or some of your icons go walkies.

Check for an invalid PATH= statement in the autoexec.bat. This may result in the inaccessibility of the Windows groups within Program Manager. It occurs when you start Windows from the root directory but does not occur when you start Windows from the Windows directory.

It also occurs if the path is set as

```
PATH=C:WINDOWS
```

instead of

```
PATH=C:\WINDOWS
```

where C is the drive and WINDOWS is the directory in which Windows resides.

Also, if in your progman.ini file (use Notepad to view or edit it) there is a [restrictions] section containing the line

```
EditLevel=1 (or 2 or 3 or 4)
```

you will not be able to add or change any of the Program Manager groups, and thus will not be able to add icons (Figs 4 & 5).

The full set of restrictions for EditLevel= is shown in Table 1.

**Table 1: The full set of restrictions for EditLevel=**

EditLevel=n sets restrictions for what you can modify in Program Manager. You can specify one of the following values for n:

- 0 allows you to make any change (the default value).
- 1 prevents you from creating, deleting, or renaming groups. If you specify this value, the New, Move, Copy, and Delete commands on the File menu are not available when a group is selected.
- 2 sets all restrictions in EditLevel=1 and also prevents you from creating or deleting program items. If you specify this value, the New, Move, Copy, and Delete commands on the File menu are unavailable.
- 3 sets all restrictions in EditLevel=2 and prevents you from changing command lines for program items. If you specify this value, the text in the Command Line box, in the Properties dialog box, cannot be changed.
- 4 sets all restrictions in EditLevel=3 and prevents you from changing any program item information. If you specify this value, none of the areas in the Properties dialog box can be modified. You can view the dialog box but all the areas are dimmed.

To enable any of the commands or remove any of the EditLevel= restrictions, either remove the entry from the progman.ini file or set the value to 0.

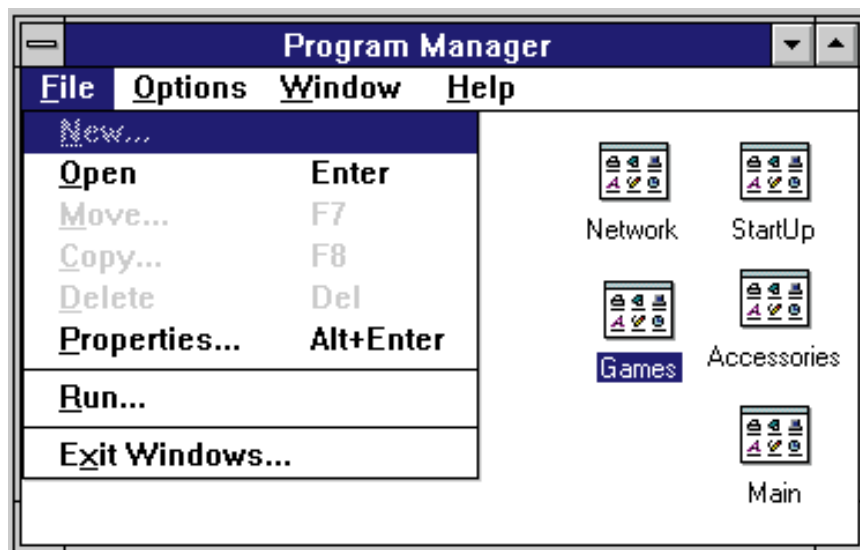
```

MS-DOS Prompt
[Settings]
Window=66 78 436 311 1
display.drv=SUGA256.DRV
Order= 5 2 3 4 1

[restrictions]
EditLevel=1

[Groups]
Group1=C:\WIN311\MAIN.GRP
Group2=C:\WIN311\ACCESSOR.GRP
Group3=C:\WIN311\NETWORK.GRP
Group4=C:\WIN311\GAMES.GRP
Group5=C:\WIN311\STARTUP.GRP

```



**Figs 4 & 5 (above)**

The EditLevel= line in Progman.ini can prevent programs from installing icons and prevent you from deleting them, creating new ones, and so on

### PCW Contacts

If you have any queries or Win3.1-related topics to discuss, contact **Panicos Georgiades** and **Gabriel Jacobs** at [win3@pcw.co.uk](mailto:win3@pcw.co.uk)

Ambra Technical Support (00) 1 800 465 2227



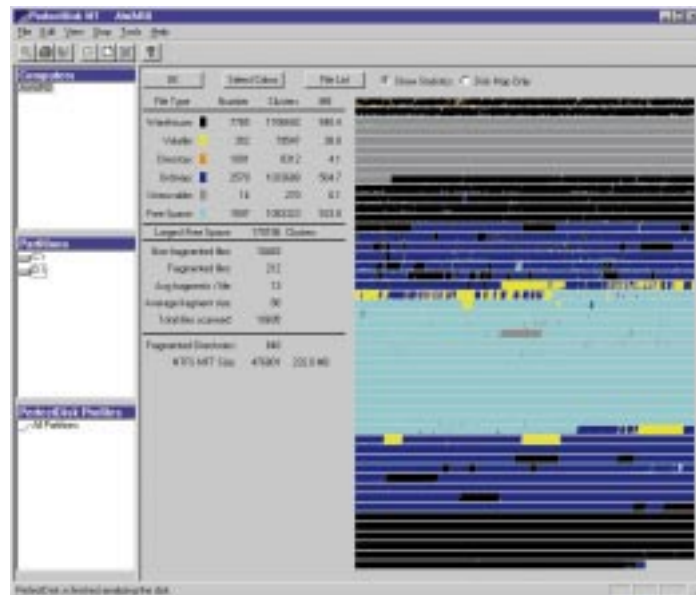
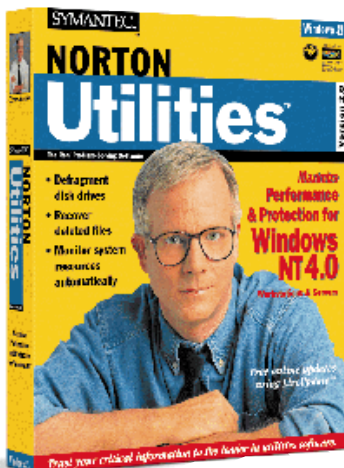
# Splash the **cache**

Andrew Ward sees performance benefits for Win NT users who cache their disk and take care with their tune-up. And, a new defrag tool which offers benefits over existing models.

**I** subscribe to the theory that main memory cache, especially if it is automatic and intelligent, as it is in Win NT, ought to be faster than any cached disk controller. Specifically, the reason is that fetching data from main memory will always be faster than fetching it across an I/O bus. In practice, though, I find that Win NT systems benefit enormously from a caching disk controller, and have some results from a DPT SmartCache IV controller that seem to bear this out.

The PM2044U SmartCache IV controller from DPT is an Ultra SCSI narrow controller which takes optional memory expansion modules to provide cache memory. With 4Mb of cache memory, even something simple like rebooting the system was 50 percent faster with all cache features enabled normally — that increase is compared to the same controller with read-ahead and dirty cache sizes set to 0. Caching, however, will still take place, so the benefit over an entirely non-cached system would be even greater.

You should take care to use the supplied Storage Manager tool to tune the cache properly. By setting the maximum read-ahead buffer allocation permitted to 70 percent, system start time actually got worse by some ten percent, compared with the figure for no read-ahead at all — it was 25 percent worse than when read-ahead was set to the default maximum of 30 percent.



**Fig 1** Even after a week of hard use, the disk looks reasonably tidy

## Disk defragmentation

The disk defragmentation debate continues, with Norton Utilities Speed Disk and Executive Software Diskeeper each having their own fans. Meanwhile, a new entrant has appeared on the market — PerfectDisk NT from Raxco Software. You can download a free trial version from [www.raxco.com](http://www.raxco.com).

Normal defragmentation tools carry out two main activities: they collect together the parts of fragmented files in one place, and they do the same with free space. The latter is important because quite often it is severe free-space fragmentation which limits performance, rather than fragmented files.

PerfectDisk goes one step further and uses a third

technique which, on closer inspection, ought to offer at least three benefits over the other tools. What PerfectDisk does is to attempt to classify files into three different categories according to how often they are used, and then move them to different physical areas of the disk.

The three categories are warehouse, ordinary and volatile files. PerfectDisk uses the age of the file and the date it was last accessed to sort files into these categories.

Warehouse files are those that are not only quite old but also haven't been accessed for a while, and these are pushed to the outer ends of the disk. In theory, these files shouldn't often change, and shouldn't often be needed. Ordinary files are those which are not recent but have been recently accessed. These are placed nearer to the centre of the disk.

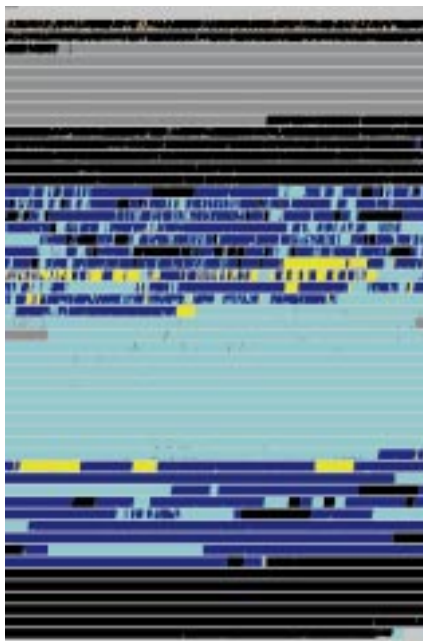
Files that are very new and hence most likely to be accessed, edited and deleted, are called volatile files. They are collected

together with free space and put into adjacent blocks in the centre of the disk.

By putting all the most frequently used files in the centre, along with the free spaces, PerfectDisk pretty well guarantees that many disk accesses will take place in one small central area of the disk. The warehouse files at the outer limits will rarely need to be touched, resulting in shorter disk-head movements and hence faster access.

Another benefit is that this optimisation scheme should last longer than most others. The volatile area in the middle will get in a mess, but the outer regions of ordinary and warehouse files should stay fairly clean. Experimental results do seem to bear out this theory. You can see in Fig 1 that a week of heavy use has hardly upset the neat arrangement of files.

Finally, optimisations ought to be quite quick, since it's only largely the middle area that will need optimising, which could be as low as 20 percent of the disk space. The down side is that the very first defragmentation run with PerfectDisk takes a long, long time — allow an hour or two for the average 1Gb to 4Gb hard drive. It's interesting to watch this first run, though:



**Fig 2** An Ameol purge wreaks havoc with the file classification system used by PerfectDisk

the number of fragmented files increases alarmingly as PerfectDisk goes about its task, before it finally starts dropping back.

Unfortunately, we don't live in a perfect world (well, I certainly don't). Purging an

Ameol database must be the most severe test around for a disk's fragmentation sanity and even a "Perfect" disk suffers. Many of the Ameol data files end up being classified as ordinary, rather than volatile, and a purge will bring about considerable untidiness to your perfect order (Fig 2).

### Command-line dialling

If you think back to my column in the November issue, I explained how rasdial can be used to automate dial-up from the command line (provided you follow my suggestions and ignore the documentation). Chris Paterson has pointed out that you can also use rasphone, but that this has benefits and disadvantages.

Using rasphone from the command line is rather like using the phonebook interactively. It supports operator-assisted dialling, it will automatically execute log-in scripts and automatically redial. However, it behaves in an interactive fashion in the case of an error, which will severely limit its usefulness in some circumstances. Instead of getting back errorlevel results, you're simply left with an error dialog box in the

```

rasphone [-v] [-f file] [[-e | -c | -d | -h | -r] entry]
rasphone [-v] [-f file] -a [entry]
rasphone [-v] [-f file] -lx link
rasphone -s

-a      Popup new entry dialogs
-e      Popup edit entry dialogs
-c      Popup clone entry dialogs
-v      Prevent entry rename with a or e
-d      Popup dial entry dialogs
-h      Quietly hang up the entry
-r      Quietly delete the entry
-s      Popup status dialogs
-lx     Execute command 'x' on dial-up shortcut file
x      Any of the commands a, e, v, c, d, h, or r
entry  The entry name to which the operation applies
file   The full path to the phonebook file
link   The full path to the dial-up shortcut file

'entry' alone selects the entry in the phonebook dialog

```

**Fig 3** The remote access service phonebook can also be used from the command line

middle of your screen. As Chris points out: "If you're running the scheduled event in non-interactive mode, then the error dialog will be concealed and the whole thing will fall over with a series of unsuccessful, queued dial-up attempts." The only answer to that is to run the scheduled event in interactive mode and be around to manually close down any error dialogs. Command-line options for rasphone are in Fig 3.

### Performance

By and large, Windows NT is fairly intelligent when it goes about its memory and cache

management. But for the keen, there are all sorts of registry settings that you can tweak to obtain that extra bit of performance, provided you accept that if you subsequently change a parameter of your system, such as the amount of memory, you could well end up with a sub-optimum configuration. You'll face the problem, next time you do a fresh install of NT, of remembering what special tweaks you've carried out.

Ideally, what you should do is to make yourself a document that is effectively an install procedure for NT. It's the perfect place to make a note of all those registry settings you change, as well as boring setup details like IP numbers.

Mike Davies has drawn my attention to the following registry sub-key which stores configuration data for paging files. There are a few values which, with care, can be used to improve performance in certain circumstances. To read up on these, look in the file regentry.hlp that comes with the Windows NT 4 resource kit.

```
HKEY_LOCAL_MACHINE\SYSTEM\
CurrentControlSet\Control\Session
Manager\Memory Management
```

DisablePagingExecutive, the DWORD value, defaults to 0, and allows user-mode and kernel-mode system code to be paged to disk when not in use. By the way, the documentation in the help file on this subject is actually wrong. It suggests that the value 0 disables paging of the executive, when it should be 1. So setting this value to 1 prevents system code being paged out to disk, but should only be applied if you have plenty of physical memory (32Mb or more). Of course, you are penalising application performance at the expense of the kernel, but for most workstation environments it will improve.

Another interesting value in the same sub-key is LargeSystemCache. This determines the size of the file-system cache and also influences how often the system writes changed pages to disk. With the value of 0, you have standard-size file-system cache of around 8Mb; and pages remain in physical memory until the number of available pages drops to around 1,000. With a value of 1, the cache can grow as large as physical memory minus 4Mb.

The default varies, depending on whether you have a server or workstation installation. Not surprisingly, the value is set to 1 (so the system cache is large) for a server and 0 for a workstation, by default. But if you have a server application, like Microsoft SQL

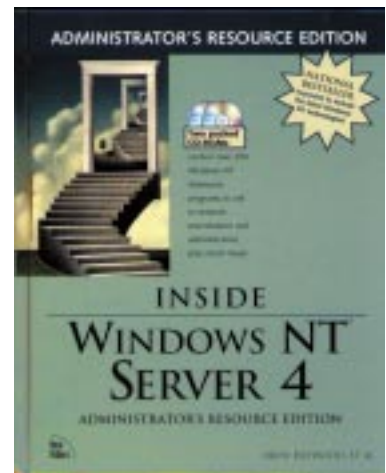
## Book review — *Inside Windows NT Server 4, Administrator's Resource Edition*

If there were prizes for the most pretentious title and the most expensive book, this would stand a good chance of winning both. Nevertheless, there is some very useful material in this volume, which complements other sources well. For instance, the diagrams explaining domain trust relationships are very useful.

*Inside Windows NT* is thorough and would make a useful addition to the bookshelves of anyone embarking on NT 4 network administration. This applies equally whether your background is non-NT, NT 3.51, or even no network administration at all.

Some of the things in Windows NT 4 which are not particularly obvious, such as how to use the DNS manager, are clearly explained, with step-by-step instructions and an ample number of screenshots. But it is really the diagrams that are this book's strong point.

Microsoft BackOffice, and especially IIS, SQL Server and Exchange Server, receive a fair amount of coverage. The two CDs contain the usual collection of useless shareware. *Inside Windows NT Server 4* is available from Computer Manuals (see "PCW Contacts", below)



Server, which embodies its own cache, or one such as IIS that needs lots of memory, it makes sense to put this back to 0, even on a server.

You don't need to edit the registry directly to change this value on a server. In the Control Panel, select Network/Services and double-click Server. To set LargeSystemCache to 1 (the default), select Maximize Throughput for File Sharing, and to set it to 0 select Maximize Throughput for Network Applications.

Now, the interesting part is that LargeSystemCache interacts with another value, Size, which is in

```
HKEY_LOCAL_MACHINE\SYSTEM\Current
ControlSet\Services\LanManServer\
Parameters
```

By changing Size from its default of 1 (which means minimise cache memory) to 2, processes and cache are more evenly matched in the fight for memory. This can significantly improve workstation performance: by how much, will depend on how many applications you run and how much memory you have.

### System policies

Back in the October 1997 column, I wrote about the system policy editor.

Unfortunately, what I did not realise at the time was that prior to service pack 3 for Windows NT 4.0, a bug in the policy editor caused it to crash when editing large policy templates (custom ADM files).

What is more unfortunate is that

although the bug has been fixed in service pack 3, yet another bug prevents the updated version from being installed. There is a workaround, however, which appeared in a recent BackOffice newsletter. The problem lies with a mistake in the update.inf file which comes with service pack 3. Overcoming the problem and getting hold of the updated poledit.exe file involves installing the service pack in the normal way and then copying the executable service pack file into a temporary directory.

Next, execute the service pack from the command line with the /X parameter, which will extract the contents into the current (temporary) directory. All you then need to do is copy the file poledit.exe to your system root directory.

If you have not already started working with system policies, now is a good time. Microsoft seems to be making increasing use of them: for example, much of what users are allowed to do with NetMeeting can be controlled by system policies.

## PCW Contacts

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*Inside Windows NT Server 4, Administrator's Resource Edition*. £65.98 for book and CD; ISBN 1562057278, reference 264786. Available from Computer Manuals 0121 706 6000 [www.compman.co.uk](http://www.compman.co.uk)  
PerfectDisk NT is available from Raxco Software's web site at [www.raxco.com](http://www.raxco.com)



# Routing around

Chris Bidmead is thrilled with his ZyXEL ISDN router — the agony and the ecstasy of ppp setup are things of the past. On a less stable note, there's a cautionary tale about backup. Just do it!

**T**he new ISDN router I mentioned last month is now going flat out, and it's transformed the way I work. You've probably heard the last in this column about the agony and the ecstasy of setting up ppp on Unix machines, because with the router on the network I just don't need to do that any more. Obviously I'm not assuming that all of you have ISDN lines, or that your budget necessarily runs to routers (although router prices have already fallen to what you would have had to pay for a decent modem a couple of years ago), but if you need help in the future with setting up ppp on an individual Unix box, see the fairly extensive coverage we've already done in the column. Or failing that, drop me an email.

## Crucial computer connection

The ZyXEL router looks like a modem and connects to the phone system exactly as you would connect any modem or ISDN terminal adapter (TA). The connection into the computer end is crucially different, though. Instead of coming in through the serial port to an individual machine, the router sits on the network, wired into my SMC TigerHub as a T-Base10 Ethernet device. On the network it behaves like a computer in its own right: a dedicated computer for routing.



There are two other connections into the router: a second phone jack for plugging in an ordinary telephone (this particular router also acts as a TA), and a serial port. This isn't for data transfer: it's for a terminal (or a Unix box running something like minicom) so that you can set up the router's various parameters through its built-in menuing system. The serial port is strictly only necessary to establish the router's dotted quad IP address (my home network is 192.168.1.0, so I've addressed the router as 192.168.1.254), because once you've done this and connected it to the network, you can telnet to it and get through to the

menuing system that way. Access is password protected, so an administrator can prevent users messing about with it.

The ZyXEL Prestige can hold up to four different ISP phone numbers, and you set it up with the passwords for each one individually. All the ISPs I've encountered either use PAP (Password Authentication Protocol) or CHAP (Challenge Handshake Authentication Protocol), and if you remember the coverage of these in this column last year, you'll recall the hours of amusement I had getting them to work with Unix. Not because of any shortcomings of Unix, but because the ISPs seemed to be scared of supporting anything but Windows at the client end.

Well, you don't have to go through any of this with the

Prestige. You just fill in the menu with the correct passwords and tell it what authentication protocol is used, and the router sets up its own internet chap-secrets and pap-secrets tables.

## Elementary tweaking

Once the router knows how to get through to your ISP, every machine on your network knows too, after you've done a little elementary tweaking. The router has to handle this very intelligently, because it may be receiving streams of packets from several machines at once. That in itself isn't too complicated — it's what TCP/IP is all

about. But each of those packet streams will be triggering response streams at the far end, and when these come back down your phone line the router has to be able to return each stream to the correct machine on your network.

If I'm sitting at this machine browsing www.yahoo.com, and you're on another machine across the room ftping a file from ftp.caldera.com, the router has to ensure that these packet streams don't get mixed up. The computer science behind this, called Network Address Translation, or NAT, is somewhat brain-softening and I've no intention of going into it here. Luckily, the router handles all this transparently.

A reader, Dave Page <[dpage@vale-housing.co.uk](mailto:dpage@vale-housing.co.uk)> has convinced me that an IP Masquerading Linux box is much more flexible, and there are situations where a router like mine just won't cut it. More about that next month, when I'll also tell you the very simple tweaks I needed to do to individual Linux, AIX, Windows NT and Window 95 machines to connect them almost instantly to the internet.

**Drives die: you do need backup**

The NEC PowerMate V100 arrived here in April 96, with a 100MHz Pentium and a 1Gb Seagate Medallist hard disk. At the time I described it as "a giant of a machine compared with my network of ageing 486s", and it's certainly been doing sterling work running my NTrigue server software. I depend on NTrigue for the (relatively small) amount of Windows software I run. But a couple of weeks ago, something happened to put a stop to all this.

Here's a tip you'll thank me for: If you try to access a directory and find you can't, and if the failure is accompanied by a strange clicking sound as though a Death Watch beetle has somehow got into your machine, don't do what I did. Don't take the machine down and try to reboot it. What I should have done is got cracking immediately to back up everything off that hard drive I could still get hold of.

The clicking sound characterises a surface failure on the hard disk. With luck, it will be localised to a few files or directories, while the machine is still up. But if you take the machine down and try to boot it again, there is a strong probability that it won't respond. That's what happened in my case.

So there I was with a PowerMate with no hard drive. The good news was that the drive was still under warranty and Seagate was

prepared to replace it with a refurbished unit. The bad news was that I was responsible for shipping it off to Amsterdam and that I risked being without a machine until it was returned, as it turned out, several weeks later.

Happily, Steve Perkins, technical products manager for drive manufacturer Western Digital, has been a good friend of this column in the past. As well as being a primary

source of information about the sometimes tricky technicalities of installing Unix onto EIDE and SCSI drives, he helped me out about five years ago with a 1Gb upgrade to one of the 486s on this network (a drive that's still running cheerfully). This time he came up trumps: alas, he couldn't readily lay his hands on a 1Gb EIDE drive to match the Seagate, but would a 5.1Gb drive do instead? Yes, Steve, it would do very nicely. The drive arrived the next day.

Steve tells me that the WD Caviar 5100RTL retails as an add-on drive kit for around £250; as an old hand who fitted his first 3Mb drive back in 1982, I'm staggered by the accessible prices these days. My only whinge with the Caviar is that the accompanying software and documentation take it for granted that you'll be installing the drive into a Windows system. If indeed this is what you're doing, the extra stuff that comes in the box (which even includes adapters for 3.5in and 5.25in drive bays) makes this a breeze to do. But when I saw that the setup software insisted on dividing the drive into 2Gb partitions because of "DOS limitations", as a Unix user I felt deeply superior. Until I remembered that in this case, it was actually Windows NT I was installing.

Well, no 2Gb partition limitation for Windows NT, you might think. In fact, you'd be wrong. A modern Linux distribution confronted with a raw drive quickly



A couple of months ago I told you about the KDE desktop (details at [www.kde.org](http://www.kde.org)) and included a screenshot I stole from the web site. Since then I've installed it for myself on top of Caldera's OpenLinux, in a way that lets me choose between KDE and Caldera's own LookingGlass desktop. The basic look of KDE is austere, but you can trick it up with icons and backgrounds if you're looking for fun. Either way, it's wonderfully practical and usable, and I suspect you're going to hear a lot more about it from me in the future.

discovers the drive is unpartitioned and unformatted, and offers to take you through those processes. When I tried re-installing NTrigue on this basis, after the third boot diskette I ran into a message to the effect that the installation couldn't proceed because something had gone wrong during the "DOS stage of Setup". After much experimentation and a phone call to the very helpful technical people at Insignia, I discovered that Windows NT 3.51 insists on finding a DOS partition on the disk, whether you want one or not. No partition, no installation. This idea may once have made perfect sense to someone at Microsoft, but it makes no sense to me.

Luckily (well, just being sensible really) the key stuff I needed on that defunct Seagate was backed up. But it reminded me to remind you about the crucial importance of backup. From your emails I get the impression that many of you regard backup as a luxury, something you might get round to installing after you've upgraded your video card, hard disk and memory. Wrong, believe me. Backup is something I'll be returning to in the months to come.

**PCW Contacts**

Email **Chris Bidmead** at [unix@pcw.co.uk](mailto:unix@pcw.co.uk)

**ZyXEL** ISDN router from P&L Systems  
[info@ppls.co.uk](mailto:info@ppls.co.uk)





# Two into one does go

But how? When you have two PCs, one Warp 3, the other Warp 4, how do you connect them in a network? Over to you, says Terence Green. Plus, the future of OS/2 desktop apps.

**R**egular reader John Hines writes to say that the column is "very keen on the networking aspects of Warp" but "often too advanced for me". Point taken, John, but consider this: this column is the only OS/2 column in the UK and is read by a very broad spectrum of OS/2 users, from corporates down to end-users. It needs to cover news and mini-reviews as well as hints and tips. As a result, and because of space constraints, I tend to rely a lot on sign-posting internet material and to back that up by responding via email to reader enquiries.

John's current problem is networking. He has two PCs, one using Warp 3, one Warp 4, which he wishes to connect in a network. Ordinarily I would suggest upgrading to Warp 4, but the PC running Warp 3 is a 386.

Steve Bailey has a similar problem in that he needs to connect a Warp 3 system to Windows 95, but he has to keep the Warp system at the Warp 3 level.

The easy answer would have been Warp Connect with the OS/2 Peer, but it is no longer sold by IBM. John tried Little Big Lan because, like me, he has heard that it can be made to work, but he hasn't been successful, even after trying to run it in a Specific DOS version. I can't find any advice on how to get LBL to work, so if any reader has the answer, do write in.

I can't think of any easy ways to connect PCs running Warp 3 and Warp 4 without buying Warp Server. It might be possible to source a copy of Warp Connect or Artisoft LANtastic for OS/2 in the small ads in Loot or Micro Mart. Beyond that, it gets expensive or tricky or both. Obviously Warp Server has client software, but it's neither a cheap



Visit the TUCOWS web site for another source of OS/2 material. The UK mirror site is at [www.tucows.cix.co.uk/os2/](http://www.tucows.cix.co.uk/os2/)

solution nor an appropriate one for two PCs.

My next thought was to use TCP/IP since that is included in both Warp 3 and Warp 4, but that can be very complicated for non-technical users. John Summerfield has a web page at [www.ami.com.au/os2/](http://www.ami.com.au/os2/) which details a way of linking two Warp systems with TCP/IP using a serial cable and the PPP dialler, but I wouldn't recommend it as an "easy" solution.

So how about it: does anyone have an easy solution?

## Software updates

Richard Stephens wants to know whether it is safe to use the IBM service for remote

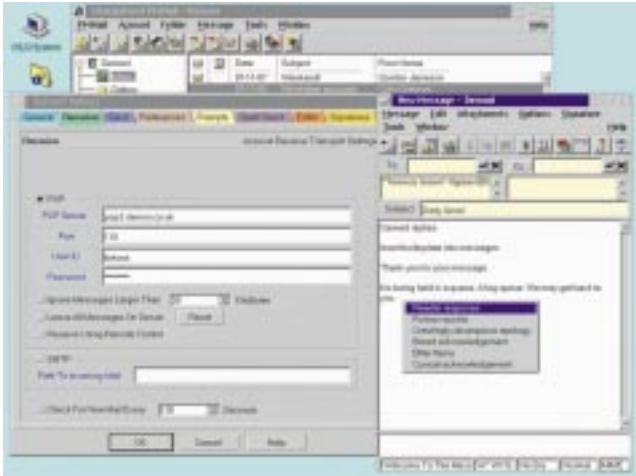
install of Fix Packs. This is the service found at [ps.boulder.ibm.com/softupd.html](http://ps.boulder.ibm.com/softupd.html) which enables a Fix Pack to be installed over the internet. You need Netscape Navigator for OS/2 or the Web Explorer in order to do this.

If you try this with a flaky dial-up connection or insufficient free space on your hard disk, it could go wrong, but it's unlikely as it is really no different to downloading the Fix Pack to a local drive and installing from there. It's simply the install process that has been automated.

The Software Updates page is a good location to browse before downloading any Fix Packs, as it displays the latest official updates. Sometimes, Fix Packs which have

## The mail must get through, so cut out the spam!

Lately I've been receiving rather more spam than I think I deserve, some of it emanating from PR agencies who send out megabyte-sized Word files that cripple my mail system. Having looked around, I've more or less settled on PM Mail because it has a bunch of nifty filters. You can find it at several sites including BMT Micro <[www.bmtmicro.com](http://www.bmtmicro.com)>.



Filter out spam and over-sized email messages with PM Mail 1.95. The registered version also handles multiple email accounts

not been officially released appear on Hobbes and Leo and the like, and these should not be applied to your working system unless you like experimenting and know how to back out of an update.

### Desktop applications: what now?

Richard Stephens also enquires after the fate of Describe, the OS/2 word processor. The company went into liquidation and no-one has picked up the product. He wonders why

no-one is interested in reviving it. The simple answer is that there is

no future for independent applications in the word processor and spreadsheet category. This applies to Windows as well as OS/2. No-one can make money with applications like this, given the price of complete suites such as Microsoft Office and Lotus SmartSuite.

The future of OS/2 desktop applications undoubtedly exists in the world of Java, specifically Java components. Looking ahead, one can see that the future of applications on Windows is there too. That much is obvious from the efforts being made by Microsoft to halt or stall the inexorable advance of Java.

Vast office suites that deliver 80 percent more function than most users need, cost a fortune to support and roll out over networks,

are the way of the past and no amount of fancy footwork can change that. But the problem with new ideas like Java is that people must have the product in their hands before they can visualise how to use it.

The general refrain has been that there are no real Java applications yet, but give it time — it's only a little over 30 months since Java was launched. Corel made a hash of its ported Java office suite, but it is regrouping with a more sensible approach written in Java

from the ground up, which should be ready later in 1998. Long before that, however, you should be

able to get to grips with Java productivity applets thanks to Lotus.

On 3rd November Lotus announced that eSuite, the Java productivity applet suite formerly known as Kona, will ship at the beginning of 1998. eSuite includes a web interface complete with browser and email plus several productivity applets. Have a look on the Lotus web page <[www.lotus.com](http://www.lotus.com)> for more details.

**“The future of OS/2 desktop applications undoubtedly exists in the world of Java...”**

## PCW Contact

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# Stationery target

The envelope issue, closed: now you can save the default position. A reader has come up with the answer, which is presented here by Tim Nott. Plus, location and overtype tips.

In December's column, I dealt with the dreaded Word envelope problem. To recap, there seemed to be no way of saving the default position and text attributes of the address when using the Tools, Envelopes and Labels command. I offered the usual bribes and David Musgrove rose to the occasion with the following, simple, procedure:

1. Open an existing template, or create a new one.
2. Tools, Envelopes, then format the options accordingly, including the distances from the top and from the left. Add the envelope to the template.
3. Save the template.
4. Delete the envelope (i.e. page 0).
5. Save the template again and close.

All new documents based on that template will inherit the address positioning you set up in step 2. Don't ask me why — I only work here. I feel it's worth a book token, though, especially as David worked this out through trial and error. However, I'd also add that my addresses kept printing out double-spaced, probably because I was copying an address with hard returns at the end of each line; so I altered the Envelope Address style in the letter template to give no spacing afterwards, in the paragraph settings.



Fig 1 Paul Herber's new, improved Diacrit helps you type in the right accent

The other mysterious problem I had was that every envelope I created was addressed to Merlot International, author of the Office Toys package I reviewed last month. Whether this was a result of my messing about or an incomplete removal of the trial product, it seems that I had an AutoText entry in NORMAL.DOT called EnvelopeExtra1, which contained the offending text: it wasn't replacing the address but was in a frame overlaying it.

Deleting the AutoText entry solved the problem. Which, while we're at it, brings us to a little gilding of the lily.

If you want to add a graphic (or more text) to your envelope, follow the rigmarole above, then, when you've added the envelope, insert the graphic. Right-click to get the properties and check that it doesn't "move with text" and is positioned relative to the page, rather than margin or paragraph. With the graphic still selected, go to the

## Listing 1: WordBasic last location macro

```
Sub AutoClose()
    ActiveDocument.Bookmarks.Add Range:=Selection.Range, Name:="Here"
End Sub
Sub AutoOpen()
    Selection.GoTo What:=wdGoToBookmark, Name:="Here"
End Sub
```

## Listing 2: VBA last location macro

```
Sub AutoClose()
    ActiveDocument.Bookmarks.Add "Here"
End Sub
Sub AutoOpen()
    If ActiveDocument.Bookmarks.Exists("Here") Then Selection.GoTo wdGoToBookmark, , , "Here"
End If
End Sub
```

Insert menu and choose AutoText/New..., then type EnvelopeExtra1 into the box. Save the template, delete the envelope, save the template as before. The new graphic should now appear on all envelopes you create in documents based on that template.

### Documents revisited

Here's a rather good tip from the ever-prolific Shane Devenshire of Walnut Creek, California: "One thing I miss in Word is a standard spreadsheet feature — returning to the last location when a document is opened. In Excel, 1-2-3 and Quattro Pro, for example, when you open a spreadsheet you find your cursor at the same location as when you left. Although this seems a logical convenience, it has never been a built-in feature of Word. To solve this oversight, I constructed the following two macros which are now part of my NORMAL.DOT. Note that you must name the macros AutoClose and AutoOpen."

Listing 1 is the WordBasic version. For those of you watching in VBA, see Listing 2.

### Diacrit update

Paul Herber's Diacrit (July's column) is a handy way of inserting accented characters into any application. The good news is that version 1.7 is now out (Fig 1), with improvements including a design facelift, the incorporation of Irish Gaelic and the removal of the limit on the number of languages. It's on the CD as diacrit17.zip. No fancy installation routine — just unzip the files into a folder of your choice; and I should also say directory, as it works under Windows 3.1, too. In fact, it works better under 3.1, as you can "direct paste" from Diacrit without going via the clipboard.

### Overtyping tip

Alan Deacon mailed me, not so long ago, bemoaning the fact that: "In Word 6 you could change between Insert and Overtyping mode by pressing the Insert key on the keyboard. With Word 97, this seems to be no longer possible. To switch in Word97 one needs to double-click with the mouse on the OVR panel in the status bar. This is much less convenient, as one has to leave the keyboard to use the mouse while typing. It does not seem to be a problem with the keyboard as the Insert key is recognised in other applications."

At the time I replied that it worked here, and that maybe the problem was in a Compatibility setting, which wasn't terribly

## Questions & Answers

**Q** Can I store templates in more than one folder, split up into letters, reports, faxes and so on. I tried creating sub-folders in my Word 97 template folder (using Explorer) but they don't appear in the Word "File/New..." dialog.

Fred Wayte

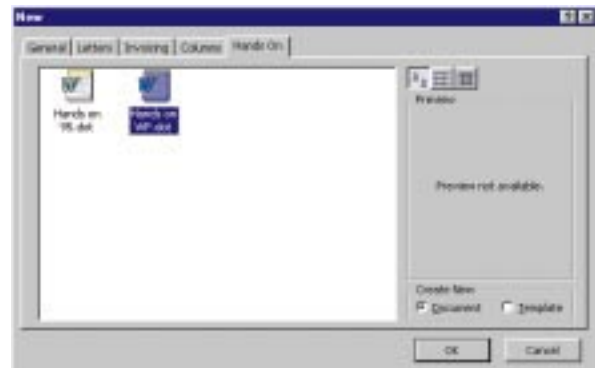


Fig 2 Adding your own custom template tabs

**A** You were very close, Fred. Try populating the new folders with some templates before going back to the Word "New..." dialog. You will then see the sub-folders appear as tabbed pages in the dialog (Fig 2).

**Q** As an ex-WordPerfect user, I miss being able to print a list of files now that I'm using Word. I'm sure there must be a way to do it, but can't find it, despite having read the manuals. In a document folder you can view a list of files in different ways, but it seems that it cannot be printed.

Sheila O'Byrne

**A** This is something I need to do fairly often to list all the screenshot files I have created to go with an article. Up to now, I have used the old standby of opening a DOS box in the relevant folder and directing the DIR command to file (e.g. DIR \*.GIF > GIFLIST.TXT).

However, as Sheila implies, surely there has to be a better way? The good

news is that there is. The bad news is that it takes a macro. Listing 3 is an absolutely no-frills example in WordBasic.

It prompts for the path you want searched, then uses the "FileFind" command to generate a file list in the array "mydocs\$()". Then, it lists each qualifying file on a separate line.

In this example, the "FileFind" command (which should all be on one line) has the options to look for all files ("\*.") and to search sub-directories (.SubDir = 1). Change the latter to 0 if you do not want to include sub-directories, and the former to suit the extension required.

You might want to create a dialog to enter the file extension and sub-directory options — I leave this as an exercise for the reader.

**Q** How do I create the less common fractions, such as 1/3?

Sheila O'Byrne [again!]

### Listing 3: No-frills file list macro

```
Sub MAIN
  CurrentDir$ = InputBox$("Enter the folder path")
  FileFind .SearchPath = CurrentDir$, .Name = "*.*", .SubDir = 1
  size = CountFoundFiles() - 1
  If size >= 0 Then
    Dim mydocs$(size)
    For count = 0 To size
      mydocs$(count) = FoundFileName$(count + 1)
      Insert mydocs$(count)
      InsertPara
    Next
  End If
End Sub
```

## Questions & Answers (cont'd)

**A** You'll find that 1/4, 1/2 and 3/4 are built in to standard fonts as single characters (ANSI 188-190). Word's "Autoformat as you type" has an option to convert these on the fly if you type, say, one-slash-two. Failing that, you can grab them from the character map, or type Alt + 0188, 0189 or 0190. The others you'll have to fabricate. To get 1/3, for example, the quick way is to format the figure one in superscript and the figure three in subscript. This doesn't match the built-in fractions very well, so you may want to experiment further.

In 12pt Times New Roman text, I can get a better result with superscript: figure one in 9pt, italic-slash in 12pt, then a normal, 6pt, figure three. Having done all this, you could then create an AutoCorrect entry to do this automatically when you type 1/3.

**Q** I am having a problem with my word processors, namely MS Word 97 and WordPad. The problem is that the only font I can access is Roman 10cpi.

I have also tried virus scanning, in case I had a macro virus, and the Repair Font Folder utility in Tweak UI, but with no success.

Paul Rimmington

**A** It's an oldie but it's a baddie, and it's particularly relevant to word processing and claims a lot of victims. If you don't have a printer driver installed that supports TrueType, then you won't be able to use TrueType fonts. The "Generic/Text only" doesn't. It's a trap that often gets notebook users who only print from their desktop machine, and it's been around since Windows 3.1.

**Q** In Word 7, and previous versions, tables defaulted to having no borders. In Word 97 this appears to be reversed. How can I stop new tables having borders?

Alex Nash

helpful but it was the best I could do. Fortunately, Alan solved the problem himself, like this:

*"I hadn't set the shortcut key for this action. I assumed it was a default shortcut. In case anybody else wants to know: Tools, Customise, Keyboard... button. Then in the*

**A** You're going to love this, Alex. I quote from that font of all wisdom, the Microsoft Knowledgebase: "This is a design change in Microsoft Word 97 for Windows. When you insert a table with the 'Insert Table' toolbar button, Word automatically applies a 0.5pt grid border by default. NOTE: There is no way to disable this functionality or to change the applied border size."

There are only two things I can add. One is, why the "design change"? I can't believe anyone really wanted this. The other is that the quickest way to get rid of the things is to place the cursor anywhere in the table and select "None" from Table, Table AutoFormat.

**Q** How can I reprogram the right mouse button menu in Word 97?

Andrea Holmes

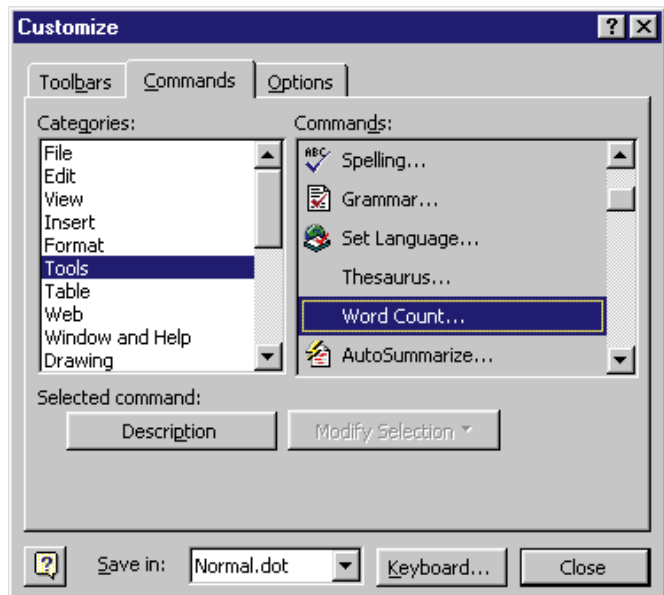
**A** Go to Tools, Customise. From the Toolbars tab, check Shortcut Menus. A toolbar will appear with three menus: Text, Tables and Draw.

To take an example, let's say you want the Word Count command available from the Text right-mouse menu (Fig 3). Click on Text, then again on Text from the list that drops down. The standard right-button text-editing menu will appear and stay open.

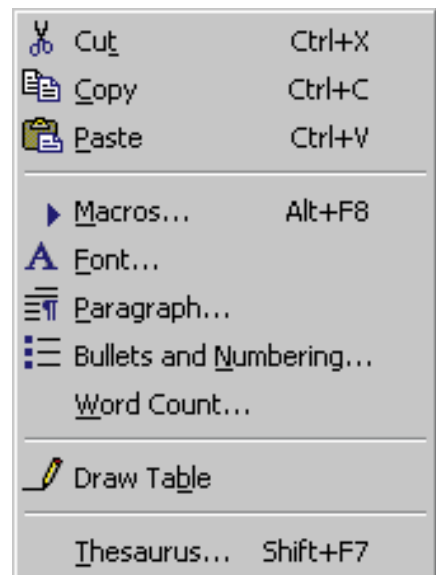
If you want to remove items, just drag them off. If you want to add commands, then go back to the still-open Customise

Category list select All Commands, and in Commands select Overtyping. Click in the Press New... box and press the Insert key, then Assign, Close and OK back out.

*"If you want this change to be global, choose NORMAL.DOT from the 'Save changes in' list."*



**Fig 3** Adding commands (left) to the right mouse button (below left)



dialog and switch to the Commands tab. Use the Categories and Commands lists to find the command you want and drag it on to the place you want in the menu. Close the Customise dialog and the Menu toolbar and all its sub-menus will disappear.

I've just done this with the Tools/Word Count command and can now see, with minimal mouse-movement, that it's time I stopped for this month.

## PCW Contacts

You can contact **Tim Nott** by post via the usual PCW address (page 12) or at [wp@pcw.co.uk](mailto:wp@pcw.co.uk)



# Received wisdom

The Received formula calculates interest received on fixed deposits, but what if you need exact figures at various times? Stephen Wells looks to the Future Value function.

**R**eader Mathew Ong, of Borneo, came across a copy of *PCW* in a church sale! Following this splendid introduction to the magazine, he wrote to ask the formula for calculating the interest on fixed deposits. He had been advised to use the RECEIVED formula but it didn't give him the exact answer.

The RECEIVED function, in the Analysis ToolPak, calculates the amount received at maturity for a fully invested security, normally a bond. Its formula is Investment divided by 1 minus (Discount times DIM over B), where the Discount is the security's discount rate, DIM is the number of days from issue to maturity, and B is the number of days in the year (some institutions use 360, others use 365). What Matthew probably wants is the formula

$$=PV * (1 + Rate)^{Nper}$$

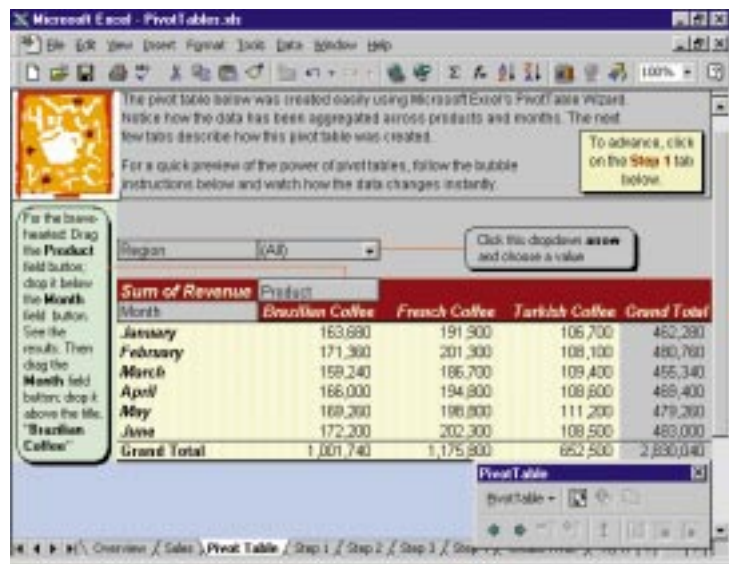
where PV stands for present value, Rate is the interest rate for the period and Nper is the number of payment periods. The carat mark (^) means "to the power of".

If you start with a capital amount of £1,000 and interest is not compounded and five percent is paid annually, then after a year, the account is worth £1,050. If it is compounded monthly and left for a year, then after the first month, the account is worth £1,004.17, after the second year £1,008.35, and after the twelfth it is worth £1,051.16.

Using the formula above, for this example: PV = 1,000, Rate = 5%/12 and Nper = 12. To compound quarterly, the Rate is 5%/4 and the Nper 4. To compound daily, the Rate is 5%/365 and the Nper 365.

Typically, you wouldn't create your own formula but use Excel's Future Value function FV(Rate,Nper,Pmt,PV). To use the same example, FV(5%/12,12,-1000).

**Fig 1** On this month's *PCW* cover disc is a useful, short, tuition file for Excel 5 and above which gives you practice in making PivotTables



Payment (Pmt) doesn't apply, so you just put the comma in to acknowledge its absence. The principal amount, or Present Value, is entered as a negative because Excel assumes cash you pay out, such as deposits in savings, is best represented by negative numbers, and cash you receive, like dividend cheques, is shown as positive numbers.

## Consolidation in Excel

Louis Passfield, in Brighton, wants to summarise his worksheets of recorded results in the field of human exercise physiology. His needs are too specialised to detail here, but it prompts me to cover the basics of consolidation in Excel.

Say you have 12 worksheets and the tabs are named January to December. The 13th sheet is for a summary. Column A and Row 1 are for labels. In cell B2 of the summary sheet you want the total of each

B2 cell in all the monthly sheets.

Click B2 on the summary sheet and select the SUM tool, or enter =SUM. Choose the January tab. Hold Shift and click the December tab. The December sheet is displayed. Click B2 on that sheet and press Enter. You are returned to the summary sheet and the total has been entered. The formula will be

$$=SUM('January:December'!B2)$$

Click on the fill handle in B2 in the summary sheet and drag this formula down to the bottom row of the sheet and across to the last column, and all the other comparable totals will immediately be entered. In other words, cell AF14 will have

$$=SUM('January:December'!AF14)$$

There were 11 functions you could use for consolidation in Excel 4, and in later versions this was increased to 18. To quickly access those functions and take advantage of other options for

## Questions & Answers

**Q** In Excel 95 I have set up a Report Manager for January and was hoping that I could apply this to every other month of the year. However, if I load February, I do not seem to be able to apply the same conditions to this workbook as for January, because the report manager is empty for February.

**Cedric Roberts**

**A** The set of display and print settings which applies to a workbook is called a View, so start by creating a View that includes all the options you want. This will be used by every worksheet in the workbook. What you might have to do is combine your workbooks so that all the worksheets are in one book. Keep backups before you try this.

**Q** Is there no way to change the defaults for the header and footer options in Page Setup to something else, such as "None"? Also, I often need to set custom number formats and find it irritating that I have to set these for every workbook instead of being able to set them as a format available to all.

I don't suppose there is a way to achieve this, other than setting up some macros linked to buttons to do the job? I suppose I will have to wait until Microsoft implements it in some future version of Excel.

**Chris Vivian**

**A** You can have these defaults and many more if you put them in the template which initially opens.

Open a new workbook. Set the number and type of sheets you want initially in your workbooks; the cell formats you want on the Format menu (particularly Custom formats); cell styles; page formats and print area settings for each sheet; text you want to repeat in each new workbook or worksheet, such as page headers and row and column labels; attached custom toolbars; and macros, hyperlinks, and ActiveX controls on forms.

You can also hide sheets, rows and columns and prevent changes to worksheet cells, and set workbook calculation options and window display (with the Tools, Options command).

Once everything is as you want it, choose Save As on the File menu. In the File name box, type Book. In the Save As type box, choose Template (\*.xlt). In the Save In box, select the XLSTART

folder (which will probably be in the C:\Program files\Microsoft Office\Office directory). Click Save.

The defaults you have saved will be available when Excel opens, and in all new workbooks which you subsequently create by clicking New. To copy styles from another workbook, open it and then open the workbook or template in which you want to put the styles. Choose Style on the Format menu. Choose Merge. In the Merge Styles From box, double-click the workbook which contains the styles you want to copy.

**Q** I want to be able to change Excel's default directory. I have Excel 4, running under Windows 3.1 on an older machine, and the latest Excel on a newer one.

**James Thompson**

**A** With Excel 4, you use a startup switch. Choose Run from the File menu of File Manager and enter Excel.exe followed by a space, followed by /p directory path. To name the working directory "James", you would enter Excel.exe /p c:\James.

In Excel 97, choose Tools, Options, General, Default file location. If you have never changed it since installation, it will say C:\My Documents. Replace this with C:\James.

**Q** One minute, there I was, dragging and dropping using the grey outline box as a visual clue to where the cells would drop. But the next time I used Excel, that feature had gone. Where to? I have no idea. I can see no way to "enable" this feature in Excel "options".

**Johnathan Cobb**

**A** It took me a couple of messages back and forth to understand Johnathan's problem. You can enable or disable drag and drop under Tools, Options, Edit, Settings. But once you have it, the little grey range indicator box comes too.

As Johnathan has Office 95, I asked him to check Word — he said it was working OK there. I also asked him if the AutoFill handle in Excel gave him a grey box? Then he told me he had found the solution. According to Johnathan, he had installed a new Hercules Stingray 128-3D graphics card which came with a new driver, version 1.07. He went back to using an older version of the driver (1.04c) and everything returned to normal. You could say the old grey box is just what it used to be. ➤

consolidation, like summarising Lotus 1-2-3 worksheets on an Excel worksheet, you can use the Consolidate facility on the Data menu. Here, you can choose whether data from other workbooks is to be linked or not. If it is linked, the summary sheet will update when the source numbers are changed.

One of the things Louis commented on was the difficulty of understanding PivotTables. I agree with him, so to help Louis, myself, and other readers I've put a training course (developed by Ganesh Ram, of Baarns Consulting, India, for Microsoft) on this month's PCW CD. Just open

PivotTables.xls in Excel 5 or higher (Fig 1).

### Remote control

There can be a remote circumstance in which Excel 97 doesn't recalculate automatically. You need a run of 18 or more consecutive formulas, where each formula refers to the cell to the left of itself and this run of formulas occurs in a row number that is divisible by 16 with a remainder of 1 (for example, row 33). There must also be a formula that references at least one cell in a row above the run of formulas.

To try it, go to row 33. Select D33:U33 and type =C33+1. Press Ctrl+Enter. In cell A36, enter =D33. In cell A37, enter =D17.

Now change the value in cell C33. Under these circumstances, the value in cell A36 does not recalculate.

Microsoft knows about this and you can download a fix from its web site at [www.microsoft.com/Excel/Recalc.htm](http://www.microsoft.com/Excel/Recalc.htm).

However, before it works you need to have the Office 97 SR-1 patch. Because there have been various versions of this, you should download the Office 97 SR-1 version checker.

But that's all too much of a palaver for me. I just press Ctrl+Alt+F9 and the cells recalculate as they should.

## XLS How-to: Useful bits & pieces

### Formulas

*How does Excel distinguish between a name and just text in a formula?*

Define text by putting it in double quotations.

*How can I quickly insert a name in a formula?*

Start the formula with an equals sign and at the point you want to enter a name, press F3. This will display a list of the available names and you click on one. Shift+F3 offers a list of functions.

### Functions and fields

*What's the difference between the COUNT and COUNTA functions?*

You use COUNT when you want to know how many cells in a range contain numbers. COUNTA tells you how many cells in the selected range are not empty.

*How many fields can Excel display on a data form?*

Up to 32. But you can have up to 256 fields in an Excel list which is used as a database.

### Listing & sorting

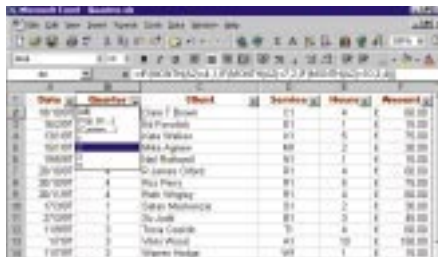
*How can I sort my invoices by Quarters?*

If the dates of the invoices are in column A, insert an extra column to hold the number of the quarter — say, column B. Row 1 has the labels, Date and Quarter and so on. In cell B2, insert the code in Listing 1. Click on the row number and choose Data, Filter, AutoFilter. Click on the new down arrow in B1 and choose 1 — that displays all the invoices in the first quarter; or choose 2 to see or print the second quarter's invoices; and so on (Fig 2). If you don't want column B to print out, right-click on

the column label and choose Hide.

*How can I make an Excel list of my Microsoft Outlook Contacts addresses?*

Open Outlook. Choose successively: File, Import and Export, Export to a file, Contacts folder, Excel. Name the new file and choose its directory. All the field names will appear in the first row. Click the row letter and make them



**Fig 2** It's easy to sort your invoices by date, in Quarters: add a column and use AutoFilter

bold or coloured. This change of format will tell Excel to leave them at the top when you sort.

*Can I create my own fill series?*

Yes. Enter the list on a separate worksheet in the order you will always want it. It might be counties, products or salespeople. If the list will contain numerals, like stock numbers, format the empty cells as text before you enter them. Choose Tools, Options, Custom Lists, Import.

### On the net

*How can I get the latest US stock quotes?*

In Excel 97, select Data/Get External Data from the menu bar and then Run Web Query. In the dialog box with available

query files, double-click "Detailed stock quote by PC Quote, Inc." Specify where you want to put the quote, and enter the symbol for the stock in which you're interested (Fig 3).

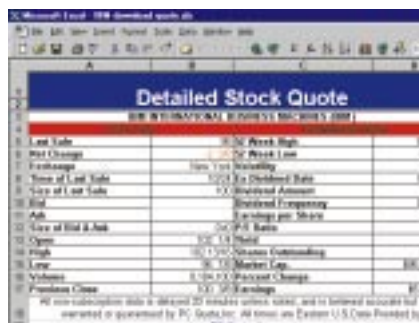
*When I dial to connect to the internet, my PC speaker is too loud.*

With Windows 95, choose Start, Settings, Control Panel. Then open the Modems icon and choose General, Properties, and move the speaker volume slider to the left.

### Printing

*How can I be sure I have the right printer drivers installed?*

In Win95 choose Start, Settings, Control Panel, Printers, "your printer", File, Properties, General, Print Test Page. The printout will detail your driver settings and confirm whether they are correct.



**Fig 3** Excel has web query forms, made to accept stock exchange listings from the internet

*How can I omit parts of the worksheet when I print it?*

Hold down the Ctrl key and select parts of the sheet you want to print. Choose View/Page Break Preview from the main menu. Then choose File/Print Area/Set Print Area from the main menu and click OK.

### Listing 1

```
=IF (MONTH(A2)<4, 1, IF (MONTH(A2)<7, 2, IF (MONTH(A2)<10, 3, 4) ) )
```

## Book review — Quick Course in Microsoft Excel 97

I have been surprised lately by the number of advertisements for PAs in the appointments pages of the broadsheet press, which call for experience not only of word processing, which is to be expected, but also spreadsheets. Often, Office 97 is specified. For those senior secretaries who are not up to speed in Excel 97, this book makes an ideal starter course. It bills itself, quite fairly, as "The Best Low-Cost Training for New Users".

Although it doesn't include a disc with examples, it illustrates how to quickly set up brief ones. It then clearly explains everything about entering data as text, values, dates and times; using ranges; keyboard shortcuts; and properly saving workbooks. There is a comprehensive section on



editing, formatting, and preparing for printing. Calculations, functions, and graphing are well explained, too.

The second part of the book delves more comprehensively into presenting data, sorting and filtering lists, creating simple applications like an estimate, and creating multiple scenarios. *Quick Course in Microsoft Excel 97* demonstrates, in easy steps, how to create spreadsheets for performing important tasks such as analysing income, budgeting, and projecting a profit margin using iteration.

This 192-page, well-illustrated book is good value at £13.99 and is available from Computer Manuals.

### PCW Contacts

Stephen Wells welcomes problems, solutions or suggestions relating to spreadsheets. Write to him at the usual PCW address (p12) or email [spreadsheets@pcw.co.uk](mailto:spreadsheets@pcw.co.uk)

Computer Manuals 0121 706 6000  
[www.compman.co.uk](http://www.compman.co.uk)





# The search for **truth**

Mark Whitehorn reports on his quest to discover why minus one is considered to be true while zero is false. Plus, useful tricks in Access to help you with data entry and retrieval.

**A**ccess provides tricks to aid data entry. Not only are these worth knowing about, but if you develop applications for others, they are well worth passing on to your users.

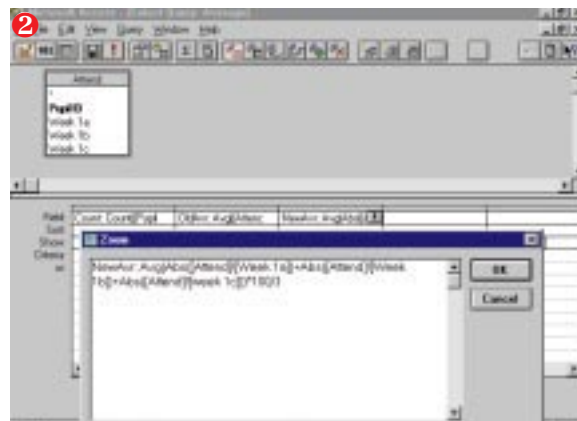
As soon as you create a new record, any default value that has been set for a field will appear.

- If you enter a different value (thus replacing the default value) you can “recall” the default value by pressing Ctrl+Alt+spacebar. (*The + symbol means that these three keys are pressed simultaneously.*)
- To replace an existing value with the value from the previous record, is Ctrl+'. Before anyone else points out that the relational model doesn't support the concept of a “previous” record, I'll do so myself (Access just maintains the concept for our convenience and this shortcut happens to be very useful during data entry):  
Insert the current date is Ctrl+;  
Insert the current time is Ctrl:-  
(i.e. Ctrl and colon, so on most keyboards it is effectively three keys at once — Ctrl, Shift and the key that is both semi-colon and colon. Sounds confusing, but easy to do in practice).
- To put a carriage return into a memo or text field is Ctrl+Enter

## Filtering by selection

Filter by selection appeared in Access 97 and is a great boon; under-used in my opinion, and also worth passing on to your users.

- Suppose you have a large table of data (viewed either as a table or via a form). If you move the cursor into a given field and press the “Filter by Selection” button, you can effectively query the table to reveal only those records which have the value in the



field that you selected. So, given 8,000 customer records, you can filter out those customers who live in Worcester, say. It gets better because you can then select another field and, by clicking the button again, you effectively add the value in that field to the selection criteria. This makes it easy to home in on the records you want.

## Why is the TRUTH so negative?

A question I raised a couple of issues ago was: “Does anyone know which bit of computer history means that -1 is regarded

as true, while zero is false?”

The response was excellent and I now have an answer. In fact, I have several, some of which differ significantly in detail. (*Sigh!...*) Life is never simple.

I have included all the replies to date in the Access database on our cover-mounted CD-ROM which you can browse for detail — it is best viewed using the form called ANSWERS (Fig 1). Anyway, a quick summary follows.

The convention is adopted so that logical functions such as AND, OR and XOR etc, work correctly on the binary representations of the numbers. These functions

work correctly when binary 0 is used to represent FALSE and binary 1 is used to represent TRUE.

“But just a minute,” you cry. “I thought TRUTH was -1, not 1?” And so it is, but that is in the decimal world, not the binary. To explain further: suppose you are going to use a byte (eight bits) to store a representation of TRUE and FALSE. Since binary 0 is FALSE and binary 1 is TRUE, it seems logical to fill all of the eight bits as follows:

- All zeros (that is, 00000000) mean FALSE.

## Questions & Answers

**Q** I am a schoolteacher and use Microsoft Access to run all my administration within my department. I use a yes/no field to mark the register and I do this by dividing each week into three. I have tried to add these together to give me an average attendance for each pupil, but because the yes/no field returns values of 1 and 0, the average appears as -?????. Is there any way of converting the 1 to a positive number? The expression I use to do this in a query is:

Average:

```
Avg([(Attend]![Week1a]+[Attend]![Week 1b]+
[Attend]![week 1c])*100/3
```

Brian Phibben

**A** You can return a positive value from a Yes/No field using the ABS function. For example, in a query,

```
Expr1: Abs([Week 1a])
```

will return +1 for every "Yes". Essentially, the ABS function will simply remove the minus sign. So, your formula could be rewritten as

```
NewAvr: Avg(Abs([Attend]![Week
1a])+Abs([Attend]![Week 1b])+Abs
([Attend]![week 1c]))*100/3
```

This is demonstrated in the Access 2.0 file included on our cover-mounted disc.

**Q** I am currently working for the Cystic Fibrosis Trust and have a database which has been created in Access 2.0. The database collects clinical information on cystic fibrosis. One of the fields within the database collects the patient's town of birth. What I would like to do is have a drop-down selection box which gives a listing of all the towns in the UK. Do you have, or would you know where I could get, such information in a suitable format?

Fiona Muhsin

**A** Your question is interesting because for the first time that I can remember in this column, it concerns the data and not the database. I have an incomplete list of towns (about 550) which I am happy to send you. I think that such a list might be useful for many readers.

• If anyone has a suitable list (that they are certain is not copyright) please send it to me. I will combine all the lists into one, remove the duplicates and publish the finished list on our cover disc in a variety of formats (say, Access and text) so we can all benefit.

• All ones (that is, 11111111) mean TRUE, which is what happens at the binary level.

However, PCs use what is known as "two's complement arithmetic" and in this notation the binary number 11111111 represents -1 rather than the 255 which you might expect. So, at the binary level, Access uses 11111111 to represent TRUE and at the decimal level we see that as -1.

### More on dates

In December I published a list of data manipulation functions from Simon Faulkner. John McCormack writes: "The LastOfMonth formula (as per Simon Faulkner) did not work out when I tried it yesterday, 31/10/1997. It gave 30/10/1997 as the last day of the then current month (Oct'97).

"It seems in cases like this that one ends up with the last day NUMBER of the previous month. The above instance also

happens for July31 (you get July30) because the last day of the previous month is a 30th. Ditto for similar 30...31 duo's. And for 23rdMarch you get 28/3/1997.

"Nevertheless, Simon's formulas could be very useful. If he amended his LastOfMonth to

```
DateAdd("d",-1,DateAdd("m",1,
now()-day(now()+1))
```

this might improve that formula. It kicks forward to the first day of the following month with the latter part, and then steps back one day to land at the last day of the current month. But check it out because I only figured it out ten minutes ago!

"Your Database articles are the best thing in PCW for me, and many ideas there are very useful, so I do hope I might be wrong in the above assessment, to avoid upsetting the good work of volunteers of useful information such as Mr Faulkner."

This is a sentiment with which I heartily concur. I certainly value the contributions that readers make to this column, especially those which stimulate others into responding, as John has done.

### Making the grade

Also regarding the December issue, reader Peter Vize provided a solution for producing grades for student marks.

Peter's solution used a table like this:

MAX	MIN	GRADE
999	70	A
70	65	B
65	60	C
60	50	D
50	40	E
40	0	F

Meanwhile another reader, David Watson, writes: "I am intrigued to work out what grade I would be if I scored 70 marks according to the table on p280 [PCW Dec'97]. Would it be an A or a B?"

The answer is that he gets a B (which wouldn't please him, I suspect!). Well spotted, David. The table should in fact be:

MAX	MIN	GRADE
999	70	A
69	65	B
64	60	C
59	50	D
49	40	E
39	0	F

### Digging for gold in the data dictionary

A while ago I published a database which acted as a user interface to the data dictionary (a.k.a. system catalog) of Access 2.0. In common with all good RDBMSs, Access maintains a data dictionary as data in tables so that users can easily access information about the database itself. Reader Chris Veness has provided an excellent example of why this can be so useful (Fig 2, p289).

"Sometimes I have developed Access databases which have included a permanently increasing selection of reports as users come along to me requesting extra functionality. It can be useful to be able to give users access to these reports without either forcing them into the 'Database Window', or having a hard-wired list of available reports which has to be changed each time a new report is created to satisfy users' constant lust for new views on their information.

"The solution I have found is to create a pick list (combo box) which lists the reports

available in the database, with a label 'View Report:' or suchlike. When a report is selected from this pick list, the report is displayed in print preview mode which can either be inspected on-screen or sent directly to the printer. The secret is to use an unbound combo box with the Row Source set to

```
SELECT DISTINCTROW Name
FROM MSysObjects
WHERE Type = -32764
ORDER BY Name;
```

"Although not a documented Access

will appear in the list as if by magic, without further work.

"As a refinement, you might not want users to see all the reports in the database. In this case, limit the query to return a particular subset of the reports [Listing 2].

"If you're ambitious, you can make the information shown in a report tie in with information the user has on-screen. Say, for example, the user is displaying information in a form about a particular media type, perhaps by selecting it in a combo box named cboSelectMediaType. If the report

should also be limited to that media type, then in the event procedure, add a wherecondition to the OpenReport method so that it reads like [Listing 3]."

I have constructed an example of this and it is on our CD as an Access 7.0 file called CHRIS.MDB. Anyone working in Access 2.0 will need to modify the above code slightly before it runs, because of the code differences between the various versions of Access.

In CHRIS.MDB I have made the system files visible. I have also constructed a

combo box which uses the same technique to list, but not open, the forms that are available in the database. Forms are represented as -32768 in MSysObjects.

### Listing 1: Name change

```
Private Sub cboRptLst_AfterUpdate()
    Dim stDocName As String
    On Error GoTo Err_cboRptLst_AfterUpdate
    stDocName = Me!cboRptLst
    DoCmd.OpenReport Me!cboRptLst, acPreview
    ' leave the pick list blank
    Me!cboRptLst = ""

Exit_cboRptLst_AfterUpdate:
    Exit Sub

Err_cboRptLst_AfterUpdate:
    MsgBox Err.Description
    Resume Exit_cboRptLst_AfterUpdate
End Sub
```

### Listing 2: Limiting the query

```
SELECT DISTINCTROW Name
FROM MSysObjects
WHERE (Type = -32764) AND (Name Like "List of*")
ORDER BY Name;
```

### Listing 3: Adding a wherecondition to OpenReport

```
stWhereCondition = "[MediaType] = " & Me!cboSelectMediaType & ""
DoCmd.OpenReport stDocName, acPreview, , stWhereCondition
```

feature, this seems to produce a list of reports just as it would appear in the Database Window.

"Now set the After Update property to the following Event Procedure, changing cboRptLst to the name of your combo box [as shown in Listing 1]. This can be done as a macro if you prefer, using OpenReport and SetValue.

"Now when you select a report from the pick list it will be previewed on the screen. If you create a new report in the database it

### PCW Contact

Mark Whitehorn welcomes readers' correspondence and ideas for the Databases column. Write to him at the usual PCW address (p12) or email him at [database@pcw.co.uk](mailto:database@pcw.co.uk)

Mark Whitehorn's book, *Inside Relational Databases with Examples in Access*, is available at a special price to PCW readers: see our Reader Offers on page 322.

• Also, a copy of the book will be awarded to each reader who makes a significant contribution to the Hands On Databases column.



# At your **service**

The best way to maintain the reliability of your system is to service it regularly; preventative maintenance is what it needs, writes Roger Gann. It will repay your efforts many times over.

**J**ust as you have your car serviced annually, even though there may be nothing seemingly wrong with it, so you can give your PC a service to keep it in tip-top condition. This needn't be difficult. Unless you're running the PC in a particularly harsh environment, perhaps the best preventative maintenance you can carry out is simply to look after it, treat it with respect and don't abuse it. There are a number of steps you can take.

As always, bear in mind the grizzled maxim, "If it ain't broke, don't fix it". And don't overdo it: take the usual safety precautions, like powering down and disconnecting the PC from the mains.

*Remember: when working inside the PC chassis, avoid deadly static by earthing yourself beforehand, or wear a wrist-earthing strap.*

## Clean machine

A good place to start is personal (computer) hygiene. PCs get grubby on the outside but they also get dirty on the inside. This is because the cooling fan in the power-supply unit sucks air in from the front of the casing and blows it out the back. The air that comes in is not particularly clean, neither is it filtered, so it will carry dust with it, some of which will be deposited on the cards, the motherboard and on the rear fan grille.

Luckily, the most important PC components (e.g. hard disk and chips) are sealed, so

these won't be troubled by accumulated dust. The areas where dust can penetrate and cause harm include places like chip sockets and expansion slots. By and large, dust won't cause much of a problem, but nevertheless, the potential is there. The dust may contain chemicals, such as those in cigarette smoke. These chemicals conduct electricity, causing minor shorts and electrical signal paths where they should not be. Such chemicals accelerate corrosion on socket- or slot-based components.

So, keeping the innards of your system unit clean is good practice and it could

improve the reliability of your PC. I once serviced a PC that had been used in the clothing industry; its motherboard was entirely covered in a half-inch-thick quilt of fluff, which is great for overheating a PC!

## Tools for the job

To clean your PC and its components you'll need a few tools, including:

- a small, soft brush (a 1 in paint brush, say);
- a can of compressed air (available from most good camera shops, such as Tecno);
- lint-free cleaning swabs; and
- some isopropyl alcohol, which you should

be able to get from a chemist.

It is probably quite tempting to simply poke a vacuum cleaner nozzle into your system unit's innards. but I would advise against this as I understand that they are capable of generating prodigious amounts of static electricity, which is definitely a health risk for chips.

## Freshen floppy disk drives

Floppy disks are very reliable and don't often go wrong, so there's little to do during the annual service apart from cleaning. After a period of time a floppy drive will get dirty — even if you don't use it! This is because the drive acts as another casing air inlet and the cooling fan sucks air through the drive, coating it with dust and fluff — hold a lighted fag in front of a disk drive and see where the smoke goes! It needs to be



cleaned out, and rather than remove and dismantle it, I use a compressed air spray to blast out dust and grottiness from the drive. I then clean the head, because that will need it, too.

The read/write head needs regular cleaning. About once a year is probably the right frequency for most users. It is possible to clean it with a cotton bud dipped in isopropyl alcohol but access is almost impossible so, as with VCRs, use a special head-cleaning kit. They're simple to use: apply a few drops of cleaning solution to the cleaning disk and pop it into the drive. You then "access" the disk; the head does a "seek" and, in doing so, cleans itself.

### No seedy ROM drives

CD-ROMs are just as susceptible to dirt as floppy drives, although most good designs are "sealed" to prevent the ingress of dust; a small speck on the lens can cause mis-reads and skipping. Normally, CD-ROM drives are just too complicated to clean manually, but it is possible to buy CD-ROM cleaning kits from hi-fi stores. These resemble CD-ROM discs which just insert as per normal and "play" for a few seconds; a rotating brush gently wipes the lens.

### Hard-disk housekeeping

There's no cleaning to carry out on hard disks but there are some housekeeping tasks you ought to undertake, like deleting all those unwanted .TMP and .BAK files and defragmenting the drive. You should also perform a hard disk media test. This tests every sector on your hard disk to make sure that it is capable of holding data safely. If it fails the test, it's marked as being "bad" and DOS won't use it again. Windows 95 comes with ScanDisk, which is OK, but Norton Disk Doctor is probably better.

### Expansion slots and cards

It's good practice to remove all expansion cards from the machine every year or so. The reason for this is that over time, the contacts on the card's edge connector and those inside the expansion slot can tarnish and perhaps go intermittent.

By extracting and re-inserting a card, you make a clean electrical contact, cutting through any tarnish. You can soak your swabs in the isopropyl alcohol and thoroughly clean all the contacts in the expansion slots. You can also clean the edge connectors on expansion cards in this way.

*Don't use a pencil rubber to clean contacts!*

Remove SIMMs and reseat them while you're at it. It's also a good idea to unplug all the ribbon data cables, examine them for wear or kinks and reconnect them. If your CPU has a cooling fan, clean the dust from the fan blades.

### Chip creep

Chip creep doesn't refer to the grease-ball behind the counter at the Fryer's Delight, but a condition that gradually unseats socketed chips. Creep is caused by repeated expansion and contraction brought about by heating and cooling when you turn the PC on and off. This makes socketed components, such as cache RAM and ROM BIOS chips, gradually "walk" their way out of a socket. Once a year, you should gently reseat them in their sockets.

You don't have to remove them to do this; you just push them back into their socket. This is easy if the socket is on an expansion card because you can remove the card and lay it flat, thus ensuring that the PCB is adequately supported when you do your pressing.

It's a simple task, but don't forget to earth any static you might be carrying before touching any chips. Place a thumb on the proud chip and push down. You'll be rewarded by a satisfying scrunching sound as the chip returns to its rightful place. Exercise caution when pressing down on any socketed chips on the motherboard, being careful not to over-stress or crack it.

### Keyboard clean-up

Keyboards seem to accumulate all sorts of grot with amazing ease. Open up any keyboard and you'll be amazed at what's inside: breadcrumbs, staples, paper clips, belly-button fluff... you name it, it'll be in there. But keyboards are resilient beasts, and often, a good clean will fix an iffy key.

The first step to spring cleaning your keyboard is simply to turn it upside down and give it a good shake. Or you could give it a going-over with a compressed air spray or vacuum cleaner.

For more thorough cleaning you'll need to whip off the casing, which will most likely be held on by half a dozen self-tapping screws. Or it could be a clip-fit design, so spring the clips back to release the casing.

Stand by for a fluff alert as you lift off the casing. Keyboards vary greatly in design, but by and large, the plate with the keys on and the PCB will be permanently mated so you won't be able to clean the main board

(or film). Sometimes, if you have a dodgy key, you can unclip it and give it (and the relevant bit of the PCB) a clean.

If you use your keyboard a lot, then the key tops will be looking a little grubby. I've found that cleaning the keycaps can be very frustrating as it's difficult to do properly *in situ*. Additionally, you run the risk of flooding the keyboard with a "mud" of cleaning solution and greasy grunge. Some keycaps just pull off so you can then wash them in the kitchen sink; but you've got 102 keys on that keyboard and you must make sure you put them all back in their right places!

### A squeaky-clean mouse

You should also take the opportunity to clean your mouse — although this is one job you'll probably have to do more than once a year. A mouse invariably has to travel over a less-than-squeaky-clean surface and, inevitably, the ball picks up dirt and fluff and transfers it to the internal rollers. This results in an uneven, unresponsive mouse action with jerky on-screen cursor movements.

Here's how to clean your ball: undo the locking ring on the underside of the mouse and let the ball drop out. This can be washed under the tap and left to dry. Now look inside the ball chamber: you should see a pair of rollers, or wheels. These convert the ball motion into the electrical signals which move the cursor on-screen. They will probably have a stripe of dirt on them. You can use the isopropyl alcohol to soften the dirt and then use something non-metallic (like the plastic clip from a ballpoint pen) to scrape it off. Make sure that the debris is removed from inside the ball chamber. Don't forget to clean your mouse mat; it, too, is probably covered in debris.

### A clean screen

There's not much you can do with a monitor apart from cleaning the screen and casing. You can use a screen wipe, but I often use good old Windolene or Mr Muscle on my old NEC 4FGe. Turn it off, unplug it and don't put too much fluid on it; a monitor handles some very high voltages and, clearly, excessive water is not a good idea.

## PCW Contact

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# Brass tacks

Handling the horns can be tricky. Steven Helstrip and Rob Young take a deep breath, show how to create a realistic brass sound, and put some spit and polish on the final effect.

**C**ontinuing our series on effective instrument emulations, it's now the turn of brass programming.

Let's start at the obvious place, your brass patch. If you use General MIDI, GS or XG, there's a brass section waiting for you at patch 62. If you use something different, it's a safe bet that you've got at least one ensemble brass patch. However, the odd thing is that most "expert" MIDI programmers tell you not to use it: "It's an ill wind, used only by the lazy or the confused. Use trumpets and trombones instead."

Unless you have 32 channels or more with which to play, that's not a view to take too seriously. Brass section patches are

often full and powerful, but many trumpet sounds just squeak and it takes an awful lot of squeaking to create the same effect. The point, as always, is that if the patch makes the sound you want, regardless of its name, what really counts is how you use it.

Most brass work falls into one of two categories: occasional stab chords and short fills to highlight a phrase or rhythm, or almost constant lines and solos. The brass section patch is usually ideal for stabs, needing just a short, loud chord. To get the best from the patch in most synths, raise the note velocities as much as possible and adjust the overall mix of the sound using the channel's Main Volume controller (7) or

Expression (11). Make the top or dominant note of the chord a little longer and louder than the others. For brass fills, exaggerate the velocity differences between accented and unaccented notes, and consider doubling the top line of the fill with a trumpet patch on another channel, pitched slightly sharp by enclosing the line between two pitch-bend events.

Add some spice by double-tracking the stabs and fills: make a copy of your brass track, assign it to a different channel, and pan each to opposite extremes. Equally effective is to split three-note stab chords over three channels panned centre/halfway-left/halfway-right.

Fig 1 A three-note fall at the end of a short brass fill gives a huge boost to its realism

Start-Pos.	Length	Val.1	Val.2	Val.3
0007.01.190	190	C3	94	94
0007.01.190	190	C4	96	96
0007.01.378	184	D3	121	121
0007.01.378	184	D4	124	124
0007.02.188	352	F3	114	114
0007.02.188	346	F4	119	119
0007.03.140	60	E3	87	87
0007.03.140	60	E4	72	72
0007.03.196	72	D#3	78	78
0007.03.196	74	D#4	65	65
0007.03.258	50	D3	69	69
0007.03.258	54	D4	60	60



## New release — Cubase VST

It has been some time since we last saw a major release of Cubase for the PC. This time around, the improvements are substantial, delivering a mind-blowing studio direct to your desktop — literally. The main focus in this release is the integration of VST (Virtual Studio Technology). In addition, Cubase is now native to Windows 95 and the graphics have been brought into line with the Mac version.

VST was first developed to take advantage of the PowerMac's built-in DSPs to handle real-time processing of EQ and effects. The lack of a DSP in PC architecture has meant we have had to wait an extra year for the PC to catch up in the processing department. With a highly-specced system, VST is capable of handling up to 32 tracks of digital audio with up to four bands of parametric EQ on each channel.

The fun doesn't stop there. There are four effects-sends on each channel and a generous offering of built-in effects, similar to those found in WaveLab. There are two basic types of effect used in VST, mixer and master effects. Mixer effects are applied separately to each audio channel by using the effect-sends and include reverbs, delays and choruses. Master effects are inserted on the mix bus and include four real-time stereo multi-effects processors. Steinberg has included an "open" plug-in interface for additional third-party effects and mastering tools from ProSoniq and Spectral Designs.

### The Channel Mixer

For each audio channel there is a mixer which includes an EQ section, an effects-send strip and a master fader (Fig 3). Each EQ module is fully parametric, ranging from 20Hz right up to 16kHz. There are four frequency presets, to hone in on low, low-mid, high-mid and high frequencies. In addition, a 100-point Q parameter enables you to finely control the

width of the frequency band.

Frequencies can be boosted or attenuated 12dB.

Effects-sends can either be pre- or post-fader and you can set the send level for each of the four effects. The master strip enables you to set the gain and pan position, and provides buttons for solo mute.

Every parameter in the EQ, effects and master section can be automated, or captured by enabling the write button in the mixer window. Adjustments, made while in play, are stored on a special audio mix track. When replayed, all movements are played back in real-time, unleashing extensive creative possibilities including the ability to filter-sweep, control reverb parameters, and more. The write function also works in Stop mode, allowing abrupt changes to be made within a mix. Changes made in this way are recorded at the current Song Position. To fine-tune your movements, the mix track can be edited within the List editor.

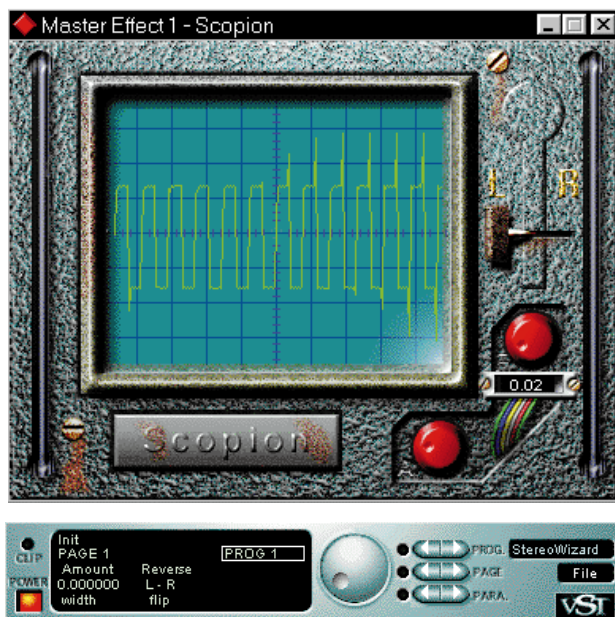


Fig 2 (right) Electro Fuzz takes mono input from a mixer effect and distorts it

Fig 3 (below) Cubase VST, on your desktop



## Cubase VST (cont'd)



**Fig 4 (top)** Scopian is an oscilloscope with adjustable sensitivity  
**Fig 5 (above)** Stereo Wizard enhances or widens the final mix

The power of VST is astonishing, way out in front of any application in this category. Determined to stay ahead, Steinberg hasn't even charged for it. A free upgrade is available for registered users who have purchased Cubase v3 since 15th January 1997 and the price for the

complete package remains at £329 (inc VAT), bringing a truly professional whole-in-one studio solution within reach of every PC owner. My one criticism is that documentation is only provided in Acrobat. This keeps the cost down, but I wouldn't mind paying an extra fiver for a printed manual.

**Price** Cubase VST £329 (£280 ex VAT), Cubase Score VST £499 (£424.68 ex VAT)

**Contact** Harman Audio 0181 207 5050

**Rating** ★★★★★

#### VST Effects

Most of the effects are presented in a familiar studio rack design and provide comprehensive yet intuitive editable parameters. Like the real thing, you have to switch on the power and begin by choosing one of the presets. Here's a selection of what's on offer:

- **WunderVerb 3** Provides a smooth, dense reverberation. It's not quite a Lexicon but can be effective when used sparingly within a mix. It comes with ten preset patches ranging from gated verbs through to large halls.
- **Electro Fuzz** This is a model of a typical transistor fuzzbox (Fig 2). It takes a mono input from a mixer effect and completely distorts it. Parameters include boost, to control the amount of distortion; clipback, which inverts the clipped signal; and volume.
- **Stereo Wizard** This is a master effect and is used to enhance, or widen, the final stereo mix (Fig 5). Its parameters are simply amounts from 0 to 1 with six decimal places and a swap left and right channel.
- **Scopian** Another master effect. It is basically an oscilloscope (Fig 4) offering adjustable sensitivity on the X and Y axis.

To create constantly moving harmonised brass arrangements, it's often best to start with several channels assigned to your various instruments. These might be trumpet, trombone and sax patches, they might all be the brass section patch, or a combination of both. Record each instrument's line individually and edit it to add as much realism as you can (see below). Remember that an "ensemble anything" should sound like a group of individuals, not a hand on a keyboard.

You can create an effective brass section with only four or five channels, panning each channel differently and perhaps adding a little chorus to blend them together. The ensemble effect can be heightened by detuning each channel to different degrees: insert pitch-bend events such as 0:63 or 0:66, or use the RPN Coarse Tuning controller, 101:0, 100:2, 6:64, raising or lowering the value for CC6 to sharpen or flatten the pitch.

#### Brass realism

The most fundamental point about wind playing is that the player needs to breathe! This fact is especially important when you are programming single lines. A 16-bar trumpet solo with no breathing space will

sound synthetic, regardless of any other touches of realism you add. Try humming a line to discover where you need to breathe, and where long notes start to tail off.

On a similar point, brass instruments are monophonic. You can get away with short "overlaps" of a couple of ticks to create a very legato effect, but anything more than that will detract from the realism. Whether you're programming solo lines, full brass arrangements or just a few stabs and fills, there's a range of techniques you can use to add some extra realism:

- 1. Falls** A fall is a run of short notes, descending in semitones and decreasing in volume, which can be used to good effect at the end of a stab chord, fill, or single-line phrase. Although you could use pitch-bend to achieve a similar effect, the best results come from inserting real note events (Fig 1).
- 2. Tailing-off** Brass notes rarely just stop when the player pauses for a breath; they first fade in volume. This is easiest to accomplish by step-entering about half a dozen Expression events just before the note ends, dropping from the initial 127 to around 100.
- 3. Bends** Brass notes often slide up to pitch (use the pitch-bend wheel), especially so with loud or high notes.

**4. Forced notes** You could think of this as an increase in "puff" as the player forces the volume higher and, perhaps, raises the pitch. Insert an Expression event of around 90 before the note-on, then use about a dozen more to increase the value to 127 where the volume-change occurs, coupled with pitch bend to force the note up in pitch.

**5. Vibrato** Players usually introduce a vibrato during sustained notes. Careful use of the modulation wheel might achieve a suitable effect provided the modulation speed is fairly slow, but you'll get more realism from entering a series of pitch-bend events that alternate between about 0:60 and 0:68. This can take some time to perfect, but Cubase users, among others, can save the part containing these events and import it whenever it's needed again.

■ *As promised, Audio Composer (AC21.zip) is on this month's PCW CD-ROM. We couldn't include it last month due to space constraints.*

#### PCW Contacts

Steven Helstrip and Rob Young can be contacted at the usual PCW address or via email at [sound@pcw.co.uk](mailto:sound@pcw.co.uk)





# The full **monty**

No half measures — choose the right images, decide on a theme and follow Ken McMahon as he shows you how to create a full photomontage. It's easy with his step-by-step guide.

**L**ast month we looked at where to get your hands on royalty-free digital photography. Now I'm going to show you how to put it to good use, by creating a photomontage using Adobe Photoshop 4.

There are all sorts of reasons you might want to do this. It may be that a single image doesn't say everything you want, or you need a more complex image as a background illustration.

If you haven't got Photoshop 4, don't worry too much. Most, if not all of this stuff can be done in other packages — even budget ones. The critical features you need are layers and the ability to create alpha channels for saving and loading selections.

You can produce photomontages without these features, but it just takes a lot more work.

All the images I've used are from Photodisc's CD collection (I've given the details on page 304). You can also get them from [www.photodisc.com](http://www.photodisc.com).

## What do you want to say?

Before you even look at any pictures, decide what it is you want to say. It's no good looking through collections of photos, hoping they'll inspire you with a brilliant compositional idea.

For the purpose of this exercise I decided to create a composition illustrating the virtues of video-conferencing, so I knew



The finished montage — easier than you might think

I'd need some talking heads, possibly a globe of some description, maybe some cable, monitors, and associated communications hardware.

After a brief perusal of the photodisc catalogues I had around ten assorted images which I thought might work. At this stage it's helpful to sketch your composition: a rough back-of-an-envelope job will do.

Once you've got this far, you can afford to be influenced by what you have in front of you. A particular picture may suggest a different sort of composition from the one you originally thought of. I decided to give my composition a day/night theme because I came across some rather good daytime

and nighttime sky shots which I thought would make an interesting backdrop.

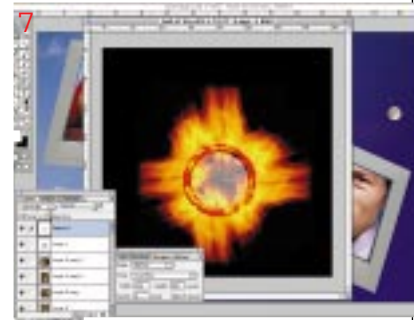
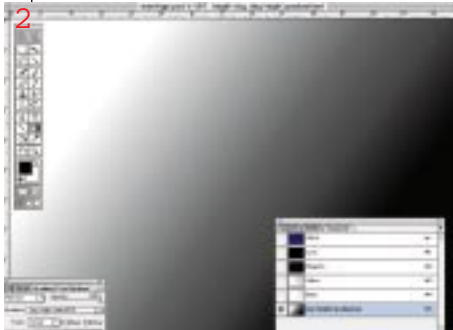
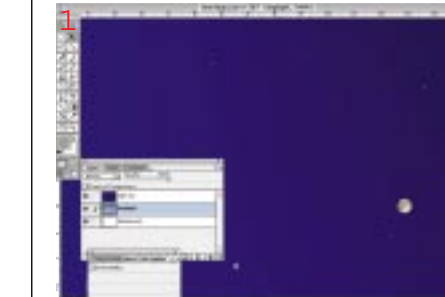
## Getting going

The first step is to set up a blank document. Mine is A6 at 300dpi. Next, we need to get our two main background images in position on their own respective layers (Fig 1).

I decided to incorporate the day/night theme by splitting the frame diagonally from left to right and having each of the video-conferencing images in different time zones. If you are using big, hired images you will need to downsample and crop so that they come in at the right size. Some of the Photodisc images are available in low, medium and

### The photomontage, step by step

Figs 1-9 Take some fresh images, toss in a few effects, do a little cut-and-paste and hey presto! Montage magic in Fig 10



## Questions & Answers

**I**n the November issue of *PCW*, you ask for suggestions on future articles. Might I suggest that you cover the issues involved in calibration, by which I mean the correlation between what appears on the screen after a scan and what actually prints out. I have been trying for some months to calibrate my scanner/printer/monitor with Corel Photopaint and as yet have had little success.

Corel v6 does not include in its templates my particular printer (HP 870Cxi). It will not accept the printer's installation disk and throws a wobbly at the end of the procedure by saying it cannot agree the test scan. I find the online help next to useless and Corel technical support for version 6 makes one feel like a second-class citizen — not that any advice they gave made sense, anyway. I would very much like to see an article covering all aspects of this particular area of graphics.

W English

**A** OK, in the issue after next I'll take a close-up look at colour calibration. In the meantime, to whet your appetite I can tell you that there are a number of proprietary colour management systems around. You might have heard of Apple's ColorSync, the Kodak Colour Management System (KCMS) or Agfa's Fototune. They all do the same thing, which is to eliminate (or at least reduce) the colour inconsistencies in different input and output devices, or to make sure that what appears on your monitor closely matches what is produced by your printer.

They all work in a similar way: by referencing profiles of different monitors and printers (you produce a profile of your scanner by scanning a test card which is then compared with a pre-scanned

control), the colour management system can adapt the output data to take account of an individual scanner, monitor or printer's specific colour bias. So, you can be more confident that a printout from your Epson colour printer will closely match the image on your Hitachi monitor. Or if you give the file to someone else, or publish it on the web, it will look the same on someone else's Philips, Eizo or Mitsubishi screen — providing their system is also calibrated using the same system.

Colour management systems have their shortcomings, though, and I'll tell you more about them in the April issue.

**Q** What's the best way of importing images into Powerpoint 3.0? My hardware is too outdated to support newer versions. Trying to insert JPEG or GIF images brings up an error message that the graphics filter for these files is missing. Is PCX the best option?

Also, is there any way of importing a GIF image with transparent background?

Steve Yentis

**A** I no longer have a copy of Powerpoint 3 but I think I'm on safe ground stating that it's unlikely it would support either JPEG or GIF, both of which are relatively new file formats.

You're on pretty safe ground with PCX and TIF, and EPS should also be okay (Powerpoint 4 supports TIF and EPS). If you don't have the necessary import filters, try reinstalling: it may just be that when you originally installed the application, you opted not to install the filters in order to save some space. The same thing applies for transparent GIFs (or GIF89a, as they're also known). They weren't invented when Powerpoint 3 was born, so it won't recognise the format. If you want to put an

irregular image, say a logo, onto a coloured or gradient background without an unsightly white square around it, you could create the logo in position together with the background in a bitmap editor, save it as a TIF or EPS file and import the entire thing into Powerpoint.

**Q** I have a photograph which I scanned (Sun "Scantak") at both 300 and 450dpi. Using an HP DeskJet 690C under FotoTouch Color, I expected the 450dpi to print out 50 percent larger than the 300dpi. It printed out exactly the same size. Is the original size held on record somewhere in the .BMP file's header?

I find dpi very difficult to grasp in these terms. The same file displayed in either PaintBrush or FotoTouch (1:1) looks enormous: is this because of the much lower screen resolution?

Philip Freeman, Haifa, Israel

**A** 5in x 4in image that is scanned same size at 300ppi will have a pixel size of 1,500 x 1,200; that's all you really need to know. If you print it at its original 5 x 4 size its printed resolution will be 300ppi (not the same thing as its halftone screen resolution — see my November '97 column for an explanation). Printed at 10 x 8, it drops to 150ppi. Altering the output size of the image (without resampling) inversely affects its output resolution.

The answer to your final question is, yes. The resolution of an average screen is around 75ppi, so your 300dpi scan would display on-screen at four times its original size but you won't be able to see all of it, even on a 21in screen at 1,024 x 768 resolution. In fact, the size of the screen is irrelevant. Clearly, an image that measures 1,500 x 1,200 pixels is not going to fit on a screen that measures 1,024 x 768. ➤

high res, but you'll still need to do some resizing to get them just right. Photoshop 4 creates a new layer when you paste in the clip. Just rename it so it's easy to see what's what in the layers palette.

You need to create a selection mask. Select the channels tab in the layers palette (Fig 2) and from the menu select new channel. Then double-click the gradient tool and select the black-to-white gradient from

the pull-down menu (I've edited the gradient and renamed it). Using the gradient tool, create a black-to-white gradient at 45 degrees, from the top left to bottom right of the screen (Fig 3).

Return to the layers palette and ensure you have the top layer selected by clicking on it in the layers palette. Choose "load selection" from the select menu and in the pull-down menu select the channel you just

created. Mine is called day/night graduation (sounds like an ad for a 24-hour university!).

Now hit the backspace key and the bottom half of the top (right) image disappears in gradual fashion, revealing the day layer below. (If the wrong half of the image disappears, it means you checked "colour indicates selected areas" instead of the default masked areas when you created the alpha channel.) You might need to

sp04 ➤

**Q** For ages I've wanted to learn how to create my own fonts, so I was pleased when you announced that this was to be your subject in the December issue of *PCW*. Now I have at last read it, I am disappointed. Your tutorial hinges on my possession of CorelDraw 7. I don't happen to own it and it isn't practical to buy it just for your tutorial.

You mention specialised font-editors: Fontastic, Fontographer, Type Designer, but you do not supply any contacts. I searched through the advertisements in *PCW* but didn't find any of those

programs advertised. So, sadly, I have gained no benefit from your article.

Andrew Romer

**A** I'll give a list of phone numbers for all the main font-editor suppliers next month. In the meantime, why not check out Dave Emmet's shareware TrueType font editor? It's called Softy, runs under Windows and lives on Dave's homepage at [home.iclweb.com/icl1/d.w.emmett](http://home.iclweb.com/icl1/d.w.emmett). As Dave admits: "It's no match for Fontographer, but a lot cheaper."

There are two versions, 1.05 and 1.06, and Dave's page has a (short) list of

known bugs so you can spot the crash before it hits.

I downloaded 1.05 and had a quick play before bedtime, and I have to say that if you want to get involved in some sleeves-rolled-up, no-nonsense font fun, there have got to be worse ways. Softy's spartan interface and edit window provide everything you need to create and edit glyphs, and there's a help file that would put some commercial software vendors to shame. Dave reckons that it's the only shareware font editor available for Windows. ■

experiment with the gradient to get the precise result you want. When you're happy with it, you can merge the two layers to conserve memory.

### Talking heads

Now we want to create our talking heads which will appear inside a display monitor.

First, using the pen tool, create a path around that bit of the monitor you want (Fig 4). Then, from the pen palette menu, make a selection and copy. Once again, try to make sure any image you're about to paste in is roughly the right size and resolution, or you'll have a lot of scaling to do later.

Paste in the screen twice and give each layer an appropriate name (or simply duplicate the layer) — I've called them "day screen" and "night screen" (Fig 5). We can use the same monitor for each head by horizontally flipping and rotating one to make it face the other.

The next job is to cut and paste the heads onto the screens (Fig 6), but first we have to get rid of the existing screen image. This is done by selecting the screen, again using the path tool, making a selection (use a two-pixel feather to soften the edge slightly) and filling with a gradient.

For both screens I used a slightly off-horizontal gradient with a mid-point highlight to create the illusion of slight curvature. The colour for each gradient was obtained using the eyedropper to sample the day and night skies behind each screen.

### Sun and moon

Next, I wanted to create a sun clock for the daylight side of the screen and a moon clock for the night. The clock pic is from the

PhotoDisc Object Series House Works CD. The Object series conveniently provides you with pre-drawn clipping paths so you don't have to do your own. The clock was pasted on top of the fireball image which had been copied and rotated three times to produce an even glow all around. The fire effect on the clock face (Fig 7) was achieved by changing the mode of the clock (upper) face layer to colour burn.

The clock face (without the wood surround bit) was then repasted on top (layer 4) using hard-light mode with an opacity of 85 percent to give the relief effect. The ellipse marquee was then used with a feather of 16 to copy the central section for pasting into the montage. When using the feather, or any other tool that uses a pixel-based measure, remember that the same settings will give a coarser effect on lower-resolution images.

The new moon (Fig 8) was created in a similar way: by pasting on the clock face using 72 percent opacity and the hard-light blending mode, and using the blur filter to create the glow.

Finally, the circular arrows were added (Fig 9). These were created in another alpha channel using the ellipse tool and stroking the selection with a width of 16 pixels. I used the maximum filter to make them a little less regular looking (having first deselected) and added the arrowheads using the pen tool to create a selection which was then filled with white.

The selection was then loaded into a new layer and filled with white. To create the drop shadow, just duplicate the layer, invert it and use the gaussian blur filter — in this case, with a value of six pixels.

A few final adjustments were made, and

as the white was a bit overpowering I decided to use a coloured gradient fill for the arrows and to stroke them with a slightly feathered selection to give them some depth — all done using the same alpha channel selection.

I also added a drop shadow to the screens by duplicating the layer and using the output level slider to turn everything black, and applying the gaussian blur filter to the resultant black box.

### Trial and error

The whole thing, including picture selection, took about four hours, although I could probably do it again in about half that time.

You have to experiment a bit as things don't always work out. I spent some time creating a sun-to-moon transition across the sky at the top, but after I'd done it I decided it looked naff. I could also have saved time by not bothering with the graduated fill on the night-side screen, which was totally obscured by the man's head. It would have been nice, after the work it took, to have been able to see all of the sun, but there wasn't anywhere for it to go other than behind the top corner of the day screen.

■ If you want to know more about royalty-free digital pictures, check out last month's column. All the pictures I've used are from Photodisc's CD collection and are also available at [www.photodisc.com](http://www.photodisc.com) along with around 70,000 others.

### PCW Contact

Ken McMahon can be contacted at the usual *PCW* address (p12) or via email at [graphics@pcw.co.uk](mailto:graphics@pcw.co.uk)

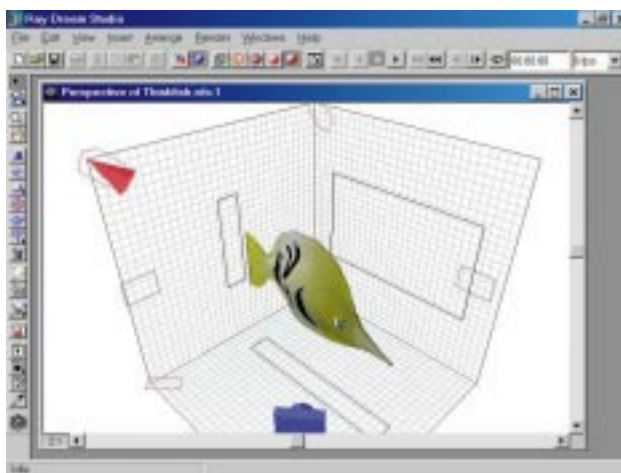


# Return to **render**

Benjamin Woolley checks out the latest update to Ray Dream Studio, which includes a revolutionary new rendering feature: the Natural Media renderer uses different LiveStyles.

I was surprised to discover that Ray Dream Studio 5, the eagerly awaited update to one of the most important mid-range packages on the market, brought my poor old Compaq DeskPro 566 to its knees, even though Ray Dream's minimum hardware requirement is a 486 system with 16Mb of RAM (with 24Mb+ recommended). Perhaps, with Ray Dream so bounteously loaded with goodies, I should excuse such sluggishness? I suppose I should be thankful that all the hourglass-watching left me more time to admire the package's interface, because it remains one of the most elegant around.

You do most of your work in a single "perspective" window which features a base plane and, optionally, two side planes (Fig 1). Each of these has projected upon it the bounding box for each axis of the currently selected object (like a shadow cast from lights to either side and overhead). You can use this bounding box to move and scale the object along the axis of the plane. This is an extremely intuitive



**Fig 1** The Ray Dream Studio 5 interface: by 3D standards, a simple, uncluttered workspace. The small blue object at the bottom of the window is the render camera. The red cone in the top left-hand corner is a spotlight

way of manipulating 3D objects on a flat screen. Much easier, I think, than the more conventional approach of having a selection of orthographic views (top, bottom, left, right, front, back) displayed simultaneously. Ray Dream also boasts a more generous selection of tools, some of them exceptionally powerful for a package in this price range.

As mentioned in last month's column, physics has arrived in the form of collision detection. There are also four environmental

primitives: fountain, cloud, fog and fire. These are (pardon the pun) primitive primitives. In particular, you cannot edit the textures ("shaders", in Ray Dream parlance) they use, which means the results they produce are not particularly realistic. They are easy and fun to use though, and would look good in any scene designed to achieve an artistic, rather than photorealistic, effect.

## LiveStyle revolution

Which brings me to the unique, indeed revolutionary, feature in this new release: the Natural Media renderer. I first wrote about it in the August 1997 column and have keenly anticipated its arrival ever since.

**Fig 2** An angel fish rendered using Ray Dream's default adaptive renderer



**Fig 3** The same fish Thinkfish style — using the Basic Draw LiveStyle



**Fig 4** In the Crystal style



Developed by Thinkfish, the aim of the Natural Media renderer is to render images in different artistic styles, called LiveStyles.

A selection of these LiveStyles are supplied as standard with Ray Dream and you can get three free ones via the Thinkfish web site at [www.thinkfish.com](http://www.thinkfish.com). Others can be bought online for around \$20.

Deploying the Natural Media renderer is simple. Ray Dream Studio offers it as one of four different rendering methods which you can pick for any scene. The other three are Ray Tracer, Draft Z-Buffer and Adaptive, the latter using different rendering techniques depending on the scene's content. You click on the Natural Media option and then select the LiveStyle you want: Basic Draw, Crystal, Silk Screen, Charcoal, and so on.

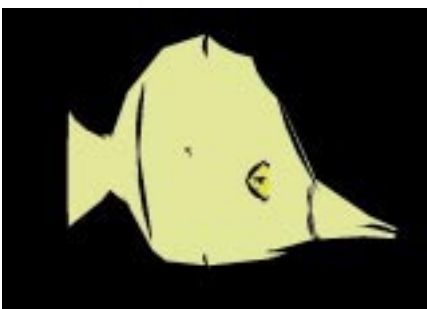
One of the much-vaunted benefits of Thinkfish's rendering technology is that it is a lot faster than photorealistic rendering methods, and this proved to be the case. When you select the Natural Media rather than the Adaptive renderer (the default), scenes appear in a fraction of the time. Indeed, as implemented here, the Natural Media technology proves itself to be a natural for real-time rendering and it seems that some companies are looking to see if they can use it for applications (such as online games) which need this facility.

Fast it may be, but easy it is not. The "Basic Draw" LiveStyle produced relatively predictable results, but the others more often than not yielded featureless blocks of colour or tangles of lines.

Natural Media rendering is an entirely new approach to 3D graphics. Scenes built for conventional renderers, as my hours of frustrating experimentation revealed, are often technically unsuitable for artistic rendering. There seems to be two reasons, smoothing and texturing.

With most renderers, the joins between the polygons that make up each object are smoothed over when the angle between them is under a certain threshold. The result

**Fig 5** In the Sketch 1 style



## Out with the old...

In the time-warped world of monthly magazines, the New Year arrives in February, so this seems like a good time to look at what 1998 might hold for the graphics enthusiast. Last year, I wrote that 1997 would be a year of evolution rather than revolution for 3D, and I think I have been proved right: VRML remains marginal but shows signs of promise; hardware acceleration technology has consolidated; no creative barriers have been broken in 3D content, but there is a lot more about.

In some respects, I am more sanguine about 1998. Early last year, manufacturers promised that PCs featuring the Advanced Graphics Port (or AGP, a special slot for graphics cards; see my July 97 column) would start to ship in the second half of 1997, and much to everyone's amazement, they did. Volume deliveries were well under way by November (hopefully avoiding a repeat of the shameful episode last year, when Christmas buyers were sold non-MMX systems only to see them made obsolete with the appearance of MMX equivalents a month later).

is a curve instead of an edge, indicated by contours in shading and highlights. With a LiveStyle, such joins are often ignored, becoming solid blocks of colour or texture. Unfortunately, this means it is often impossible to tell what shape the object is supposed to be. The problem can sometimes be solved by reducing the number of polygons that make up the shape, but often the only solution is to change the underlying geometry.

The texturing problem is trickier because texturing is inherent to rendering. The texturing tools supplied with RayDream are specifically designed to produce photorealistic results. Unfortunately, parameters such as shininess or facilities like bump mapping are meaningless when you are using Natural Media rendering — or at least they are unless the renderer knows how to deal with them. All the LiveStyles I tried seemed to ignore all texturing information other than an object's base colour, which is, in a sense, what you would

**Fig 6** In the Ink Wash style



- AGP now looks set to become as standard to mainstream personal computing as the PCI interface. It should revolutionise real-time 3D-rendered content like games, and it is significant that one of the first AGP-aware programs to be shipped is a game — G-Police from Psygnosis. It may help promote VRML from the periphery of the internet.
- The prospects for 3D graphics authoring software look good from a price/performance point of view. You can now buy a range of professional-grade packages for less than £500. However, they still lack a set of sensible standards for plug-ins and file formats — there is no Adobe Photoshop of the 3D graphics world to encourage interoperability. Perhaps one will emerge this year.
- On the content front, we have Lara Croft of Tomb Raider fame leading the way in populating the 3D world with a new breed of computer-generated character. I expect we will be seeing a lot more of her pneumatic geometry filling the virtual world. I will take a closer look at Lara in next month's column. ■

expect. However, there were no alternatives provided, nor any information as to how you could adapt conventional textures to get satisfactory results with different LiveStyles.

In fact, it was the general lack of information which was the biggest disappointment about LiveStyles: there was none to be found in the Ray Dream manual, which is a particular shame because in every other respect the documentation for version 5 is exceptionally clear and comprehensive for a package at this price.

At the time of writing, Thinkfish provided nothing but a paltry FAQ on its web site [www.thinkfish.com/tsupport.html](http://www.thinkfish.com/tsupport.html) with a few hints and tips aimed at QuickDraw developers. Perhaps there will be more on the site by the time you read this.

Such shortcomings are perhaps to be expected with a technology this new. Renderers aimed at producing particular styles of output (notably a cartoon-style look to an animation) are widely used in the professional market, but the Natural Media renderer is the first I have encountered to provide an adaptable method of generating artistic output. Perhaps we must give it time to develop? It was a shame that this, its first appearance in the graphics mainstream, should have been so half-hearted.

## PCW Contacts

**Benjamin Woolley**, writer and broadcaster, can be contacted at [3d@pcw.co.uk](mailto:3d@pcw.co.uk)



## Listing 1: MouseOver help

```

<HTML>
<HEAD>
<TITLE>Dynamic HTML demonstration</TITLE>
</HEAD>
<BODY>
<H2> This is a demonstration of handling the MouseMove event.</H2>
<P> Button 1 uses VB Script. Button 2 uses JavaScript.</P>
<BUTTON ID=Button1>Move the mouse over me</BUTTON>
<BUTTON ID=Button2 ONMOUSEOVER=Button2_onmouseOver() ONMOUSEOUT=Button2_onmouseOut()>
And over me too</BUTTON>
<BR>
<p>
<EM>Watch the text below:</EM>
<HR>
<FONT FACE="ARIAL" SIZE=4><P ID=InfoText>This will change as you move the mouse</P></FONT>
</BODY>

<SCRIPT LANGUAGE=VBSCRIPT>
Sub Button1_onmouseOver()
InfoText.innerText = "Hey! The mouse is over button 1"
End Sub
Sub Button1_onmouseOut()
InfoText.innerText = "Watch this space"
End Sub
</SCRIPT>

<SCRIPT LANGUAGE=JAVASCRIPT>
function Button2_onmouseOver() {
InfoText.innerText = "Hey! The mouse is over button 2";}
function Button2_onmouseOut() {
InfoText.innerText = "Watch this space"; }
</SCRIPT>
</HTML>

```

## Fig 1: Choosing code for web apps

When coding web applications, which way do you code? Here are some key issues.

### Dynamic HTML

#### Advantages

- ✓ Performs well once the scripts have been downloaded.
- ✓ Reduced burden on server.
- ✓ Easy to build feature-rich forms.

#### Disadvantages

- ✗ Compatibility issues between Navigator and Internet Explorer.
- ✗ Code tricky to manage and debug.

### Java applets

#### Advantages

- ✓ Powerful, productive language.
- ✓ Good for distributed applications.

#### Disadvantages

- ✗ Compatibility issues.
- ✗ Large applets are slow to download.

### ActiveX controls

#### Advantages

- ✓ Only downloaded once, when first used.
- ✓ Excellent performance.
- ✓ All features of Windows are available.

#### Disadvantages

- ✗ Not cross-platform.
- ✗ Security issues deter internet users.

### Server-side scripting

#### Advantages

- ✓ Solution for cross-platform net deployment.
- ✓ Integrates with legacy systems.
- ✓ Use whatever language you like.

#### Disadvantages

- ✗ Hard to achieve a rich interface with server-side scripting alone.
- ✗ Places a performance burden on the server.

solution rather than a traditional networked application. Fig 1 highlights some of the key issues.

Frankly, the best solution for internet development at the moment is server-side scripting: CGI scripts, Active Server Pages or whatever server-side technology you prefer. Otherwise, you have to wrestle with compatibility issues and the problems of managing parallel sets of pages for different browsers and browser versions.

The same will apply to large and diverse intranets. If you can specify all the browsers though, both Internet Explorer 4.0 and Navigator 4.0 are great client platforms.

For Windows I would tend to favour IE 4.0, because its flavour of Dynamic HTML is closer to what is likely to become the official standard, and because ActiveX controls have the performance of native code. When you install IE 4.0 though, be sure to leave out the Active Desktop. In my experience it is horrifically unreliable in its first release.



## Questions & Answers

**Q** I have written, within Excel, a custom VBA function. I have transferred my data to Access 97 because of the much better querying facilities. I tried to copy the VBA module but without success, because Access 97 does not recognise the Normsdist function. Is there a way for an Access 97 query to utilise an Excel 97 function?

R Sarno

**A** This is quite easy. In Access 97, open up the code editor, for instance by opening a module. Select References from the Tools menu and check MS Excel 8.0 Object Library. Now you can write VBA code like in Listing 2.

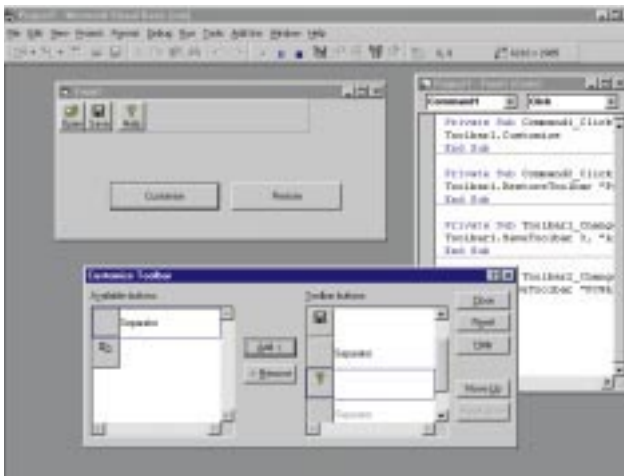
This does run Excel in the background, so performance will suffer. But if you use a global reference to Excel and keep it active while your application runs, then performance will be fine once it has loaded. The other option is to find or write a VBA version of NormsDist.

### Listing 2: VBA code

```
Dim xl As New Excel.Application
Dim result As Double
result = xl.WorksheetFunction.NormSDist(1.33)
MsgBox "The result is: " + Str(result)
```

**Q** In Visual Basic 4, I've hit a brick wall when trying to write toolbar information to the Win95 registry. When I follow this help file, it doesn't have the desired effect. It just adds an entry into the registry containing Question Marks for its Key name, etc.

Mark Gales



**A** The Visual Basic toolbar control is an ActiveX control, one of the Windows 95 controls in COMCTL32.OCX. Working in concert with an imagelist control, you can create a toolbar with icons, tooltips, text captions etc.

The toolbar does not float or dock, but it does have a nice feature: the user can customise it by adding and rearranging the icons. At runtime, a double-click opens the

### Listing 3: Puzzling parameters

```
object.SaveToolbar(key As String, subkey As String, value As String)
```

customise dialog, or you can call the customise method (Fig 2). To make the changes permanent, the control has SaveToolbar and RestoreToolbar methods, which use the registry to store settings.

This works fine in Visual Basic 5.0 and has not changed much since VB 4.0, so why does it not work for Mark? There are a couple of possibilities: one is an ActiveX

problem, probably that COMCTL32.OCX is incorrectly registered; or there is a version incompatibility in one of its dependencies.

ActiveX and registry problems are Visual Basic's biggest weakness and Microsoft has yet to come up with a proper solution. Sometimes, re-registering the control with REGSVR32.EXE works. Other times, you have to remove and reinstall Visual Basic. In the worst case, the easiest solution is to reinstall Windows.

Usually, ActiveX problems reveal themselves with corrupt icons in the Visual Basic toolbox or strange error message about incorrect registration,

**Fig 2** Visual Basic's toolbar control allows the user to customise the icons and save the settings. The innards of its registry functions are a mite puzzling, though

or errors when you try to install or remove components from VB, or when you use the object browser.

Even if all is well with the registry, the SaveToolbar method has puzzling features. One is that the documentation has contradictory information about the parameters it takes. According to Visual Basic's 5.0 online help, it looks like Listing 3.

According to Books Online: "The first

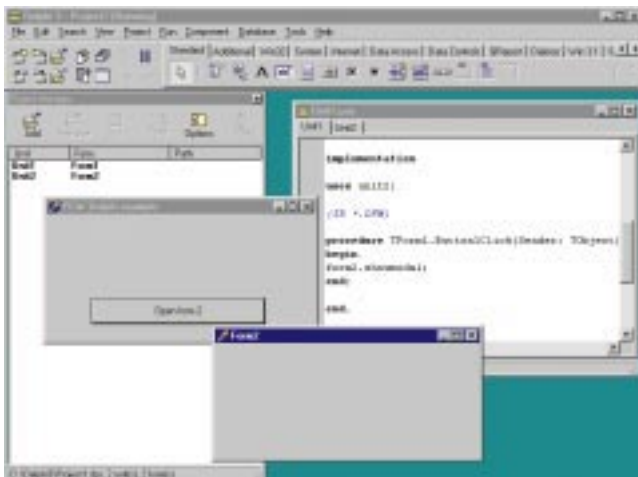
argument, key, must be an integer. The second and third arguments, subkey and value, must be strings". This makes more sense, since the API registry functions take as one of their parameters an integer representing the handle of a root key in the registry, such as HKEY\_CURRENT\_USER. It may not matter much, since on this NT 4.0 system, SaveToolbar and RestoreToolbar ignore the first parameter. Whether there is a number or a string there, the setting ends up in HKEY\_CURRENT\_USER under the value used for the subkey.

This is not really a problem unless you were relying on that first parameter to distinguish one application from another. You might argue that the toolbar settings should be stored under the "VB and VBA Program Settings" subkey, for consistency with VB's SaveSetting function. It looks messy, and should be referenced in Microsoft's otherwise excellent knowledgebase on the MS Developer Network CD and online resource.

**Q** I wish to include validation of user input within simple input screens, which displays a message and prevents the user from leaving a text box (input) if the user's input does not meet the required rules. I have scoured the VB5 manuals and help, but have got to the point now where I am just confusing myself even more.

John Bend

**A** The answer is simple: do not try to do this! John doesn't say how he tried to code the validation, but he probably used the LostFocus method of a textbox to validate the contents. If it failed validation, he used SetFocus to send the user back to try again. This works with just one text



**Fig 3 All in the Uses clause: getting Delphi to open one form from another**

**Q** I do not seem to be able to get a multiple window application to work. I want another window to open when I click a button,

but instead Delphi issues the "Unknown identifier" line and I cannot understand why. I simply created a window with a button, then added another form, and added some code to the button-clicked procedure (Form2.ShowModal, or something like that), but I still get the error.

**Jamie**

**A** The best way to explain this is that Delphi only exposes code on a need-to-know basis. Although both Form1 and Form2 are part of your application, code in

box, but where more than one field is involved it becomes a nightmare. The problem is that you cannot prevent VB from firing other GotFocus and LostFocus events; for instance, if the user is trying to move to another text box which also has validation routines. There are also anomalies concerning the order in which these events fire: you can very easily leave your application in a loop with no exit.

I am not saying it is impossible to use GotFocus and LostFocus with some combination of flags that would make it work, but it is better to use another technique. The best way is to do all your validation in one routine; for instance, when the user tries to exit the form or save the data. You can set validation rules to be enforced by a database engine, or use the Validate event of the data control. Another possibility is a timer control which checks the validity of fields at regular intervals. All these work better than using LostFocus.

Form1's unit cannot see the code in Form2's unit unless you explicitly allow it. To do this, add the unit name to the uses clause in either the interface or the implementation part. See Listing 4 for an example.

Although confusing at first, this is a Delphi strength. It reduces the risk of running the wrong code by mistake, like when different modules have procedures with the same name.

Should you add the reference to the interface or implementation? All things being equal, it is better to use the implementation part (Fig 3). This is more efficient for Delphi's compiler. But sometimes you will have no choice. For instance, if you are referring to a unit that defines a type and you want to declare a procedure which uses the new type in the interface part, then the reference will have to go there, too.

Another problem you will run into is that of circular references. If you put a reference to unit2 in unit1's interface, Delphi will not let you refer to unit1 in unit2's interface. The solution is to move one of these references into the implementation part.

#### Listing 4: Units, uses and implementation

```
implementation
uses unit2;
procedure TForm1.Button1Click(Sender: TObject);
begin
Form2.showmodal;
end;
```

### Book review — *Instant IE4 Dynamic HTML*

Authors Alex Homer and Chris Ullman have aimed at those already familiar with HTML and scripting. There is an explanation of Dynamic HTML concepts followed by chapters on style sheets, the object model, event handling, dialogs, and data binding. A reference section lists properties, methods and events plus all the dynamic HTML tags. There is a quick guide to VB Script and JavaScript.



Chapter 8 covers the compatibility issues between Microsoft Internet Explorer and Netscape Navigator, the only two heavyweight browsers left in the game. Both have implemented Dynamic HTML but there are substantial differences. The authors conclude that if you want to use Dynamic HTML, "The only real answer is to maintain at least two different versions of your complete web site." That also explains the book's title. (If you want to use Netscape Dynamic HTML, you need the parallel Netscape edition of the book.)

This drag 'n' drop jigsaw has been built with Dynamic HTML  
(Wrox Press [www.wrox.co.uk](http://www.wrox.co.uk))

#### PCW Contacts

**Tim Anderson** welcomes your Visual Programming tips and queries. He can be contacted at the usual PCW address (p12) or at [visual@pcw.vnu.co.uk](mailto:visual@pcw.vnu.co.uk)

**Computer Manuals** 0121 706 6000 for *Instant IE4 Dynamic HTML* by Alex Homer and Chris Ullman. Wrox Press £22.99. Netscape edition available.



# Address code

Why use static configuration for IP addresses, when you could save yourself time and effort by setting up a dynamic host configuration protocol? Bob Walder goes for the easy life.

**H**ow many of you had a go at implementing a bit of TCP/IP on your networks after last month's column? Assuming you understood what I was waffling about and managed to get your clients and servers speaking, using nothing but good old TCP/IP, you will by now have realised what a complete pain in the bum it is to manage your IP addresses!

Static configuration of IP addresses, the method I described to you last month, can be expensive in terms of administrative time and effort — particularly so in the case of large networks with hundreds or thousands of clients. Even small networks of just a few clients can be troublesome to administer if you are regularly making changes to your network (as I do in my test lab, for instance).

Help is at hand, however, with Dynamic Host Configuration Protocol (DHCP) which allows all hosts attached to the network to learn their addresses dynamically each time they boot up, or are moved to a new subnet. Each time they are turned off or removed from the network, however, the address is automatically returned to a "pool" to be re-used by another device.

## Setting up DHCP

The first job is to designate one of your NT Servers as the DHCP server for your network. Clearly, this machine requires a static address since it would have nowhere to look for a dynamic address, given the fact there will be no DHCP server available when it boots up. On this machine you



install the DHCP service:

1. Select the Network icon in the Control Panel.
2. Fire up the Services window.
3. Click on the Add button.
4. Select the Microsoft DHCP Server from the available services.
5. Insert the NT Server CD-ROM and click on OK to copy the necessary files.
6. Reboot your NT Server.

When the machine reboots, the DHCP

Server will start automatically. This can be configured via the DHCP Manager utility that can now be found under the Start/Programs/Administrative Tools menu.

Strangely enough, the DHCP Server is not activated automatically and must be manually added to the list of available DHCP Servers in this utility. You must also define a "scope", which is the range of IP addresses that have been assigned to you by your ISP and which are available to be

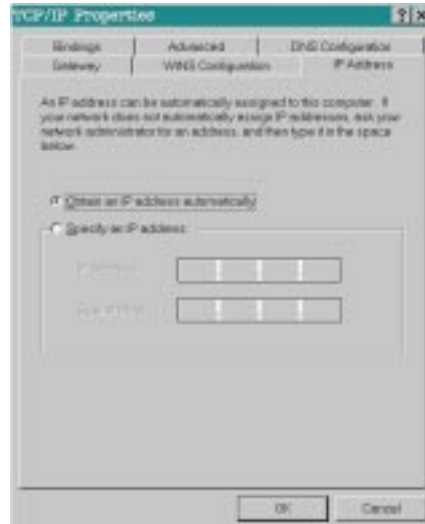
allocated automatically to your client PCs. This is done as follows:

1. On the Server menu, click Add.
2. In the dialog box which appears, type the IP address of the local NT Server.
3. Click OK.
4. Double click the DHCP server you have just added.
5. On the Scope menu, click Create.
6. In IP Address Pool, enter the IP address in your "pool" in the Start Address field.
7. In End IP Address, enter the last IP address in the range.
8. If you wish to exclude addresses, enter these in the Exclusion Range.
9. Under Lease Duration, click Unlimited (later on you can determine a shorter period to lease addresses if you wish).
10. In the Name field, type in the name of the scope (any name you like, to identify it).
11. Click OK.

There are a couple of things to bear in mind when defining your scope. The first is that most organisations will have a group of devices such as domain controllers, DNS servers, WINS servers, routers and other DHCP servers, to which they wish to assign a fixed set of static IP addresses. This can be done in a couple of ways.

The first is to keep back a consecutive group of numbers from those allocated to you and assign these directly to the appropriate machines. The second is to "Reserve" those addresses on the DHCP server we have just created:

1. In DHCP Manager, double-click the DHCP server you want to manage (you should have only one at this stage).
2. Click the scope in which you wish to add reservations (again, you should only have a single scope defined at this point).
3. On the Scope menu, click Add Reservations.
4. Enter the IP address you wish to allocate to a specific machine.
5. Enter the MAC address of the machine in the "Unique Identifier" field. The MAC address can be obtained via the IP Configuration utility which will be located in the SYSTEM directory of every Windows machine on your network. The Win95 version is a Windows program called WINIPCFG.EXE, while, strangely, the NT version is DOS-based and is called IPCONFIG.EXE. Simply double-click on the WINIPCFG file in Explorer under Windows 95 — the Adapter Address is what you are looking for. Under NT, drop to the command line and type



**Fig 1** Configuring a Windows 95 client to automatically assign an IP address

IPCONFIG -ALL and read off the Physical Address value. In both cases, it will be presented as a 17-character string in the format 00-00-92-9B-2B-A9: you type this in as a 12-character string, simply omitting the hyphens. It is very important that you get this identifier exactly right or the reservation will not work.

6. Enter the computer name in the Client Name field.
7. Click Add.

The next time that particular client attempts to connect to the DHCP server, it will be allocated the address which you have just reserved for it. But the IP address is not the only thing we can provide automatically from the DHCP server: we can also supply the Default Gateway, DNS Servers and the Domain Name. This we do through setting Global DHCP Options:

1. Select Global from DHCP Options menu.
2. Click on the Value button.
3. Select 003 Router, click on Add and enter the IP address of your Default Gateway.
4. Select 006 DNS Servers, click on Add and enter the IP addresses of your DNS servers (just as you did last month in the DNS Configuration tab of your client).
5. Select 015 Domain Name, click on Add and enter your Domain Name.
6. Click OK.

Finally, we must configure the client. The first thing is to undo most of the work we did last month. Assuming our client is a Windows 95 machine (NT machines are very similar):

1. Select the Network icon in the Control Panel.
2. Double-click the TCP/IP component.

## Questions & Answers

**Q**In a recent issue, I read with interest your answer to the question about which Windows 95 Service Pack to install. However, I think you misunderstood Mr Mallik's question, since there are Win95 Service Pack 1's available for both English and Pan-European English.

If you check out Microsoft's web pages at [www.microsoft.com/windows/software/servpak1/sphome.htm](http://www.microsoft.com/windows/software/servpak1/sphome.htm) you will see advice like: "Do not install the Service Pack 1 Update English version on the English Pan European version of Windows 95 or any other non-English version of Windows 95".

This is not as clear as it might be. Suppose you have a machine purchased in Britain, running Win95 with all the messages and so on appearing in English. You might go for the English version, especially as it is not uncommon for Britain (wrongly) to be classified separately from the rest of Europe. Also, maybe your machine was purchased from an international, perhaps US-owned company. Can you be sure they will have given you the European version of the software rather than American?

Or, you might go for the English Pan-European version. But look at the sentence above closely, especially the use of the word "other". This seems to imply that the English Pan-European version is a non-English version, in which case maybe you shouldn't go for this one if all messages appear in English.

Matters are further confused if you look for more information about the English Pan-European version. If you follow the links from the above URL, you end up at [www.microsoft.com/windows/software/localize/pan.htm](http://www.microsoft.com/windows/software/localize/pan.htm). This page contains comments such as: "Note: In order to use these components, you must be running the Pan-European version of Windows 95". There is no mention of English Pan-European here. None of this seems designed to reassure the unsure user.

I think the question of how to identify for sure which language version of Win95 you are running is a

good one, and one to which I would also like to know the answer!

Mark Pack

**A** My apologies to Mr Mallik if indeed I did misunderstand his original question. This poser set me to thinking and asking around, but to date I have been unable to come up with the definitive answer. Time, therefore, to throw it open to you readers:

- Can anyone out there shed any light on this question? How do we determine exactly which language version of Win95 we are running and which version of Service Pack 1 is applicable in each case? Answers to the usual email address, please [see "PCW Contacts", p318].

**Q**In your December column, you mentioned virus hoaxes and wrote that it is not possible to invoke any sort of virus by opening an email message; yet your colleague, Brian Clegg, wrote in his column [Business Matters]: "I received a document by email and dropped it onto my desktop. Before I could open it, all the bells and whistles went on my virus checker."

Two seemingly different views. Does it all depend on which software you use to open email? Or are you categorically stating that it is *impossible* to transmit a virus by email?

Liz Cook

**A** If you have a virus checker which is capable of detecting viruses in Word documents, or those buried in zip files, then it will, indeed, sound all the "bells & whistles" as soon as you try to move it or open it. It was the fact that Brian saved the infected attachment to a file that triggered this (some anti-virus packages can even detect the problem at the email server itself). However, there was no way that the virus could ever do anything by simply opening the email message which carried it. I am not saying that it is impossible to transmit viruses by email: quite the contrary. The growth of email, and the trend of sending spreadsheets and docs by email, has done more to increase the spread of viruses than anything else.

The point I was trying to make is that you can ignore the hoax messages which tell you that as soon as you open the

## Questions & Answers (cont'd)

email message, you will invoke the virus: this isn't possible. You would have to actually open or otherwise execute the virus file *attached* to the message in order to trigger it. There is one caveat, however.

Those of you using Outlook are provided with the option to use Word as your email editor. Apart from the fact that it is too slow, cumbersome and resource hungry for such a simple task, it does potentially

leave you open to macro virus attacks. If you *must* use Word as your email editor, ensure you disable macros and run an effective anti-virus package like Trend's PC-Cillin. Better still, avoid Word as an email editor and you won't have the problem. Does this clarify things? ■



**Fig 2** Running the IP Configuration utility under Windows 95

3. Select the IP Address tab and check the box marked "Obtain an IP Address Automatically" (Fig 1).
4. Select the DNS Configuration tab and remove the Domain Name and DNS Servers specified there.
5. Select the Gateway tab and remove any Default Gateway addresses defined there.
6. Select the WINS Configuration tab and check the box titled Use DHCP for WINS Resolution.
7. Click OK.
8. Reboot your machine.

Once your machine reboots, you should still be able to access the network and use your default gateways to access the internet, since all the relevant information should now be provided by the DHCP Server. To check that this is happening, run WINIPCFG again. If you click on the More Info button you should see a display similar to that in Fig 2.

The DHCP Server address should match that of the server we created earlier, and entries for the DNS Servers, IP Address and Default Gateway would be filled in correctly based on the information we provided to that DHCP Server. Just for the heck of it, click on the Renew button and watch the Lease Obtained date and time change as a new lease is obtained.

## Book Review: *Introducing Windows 98 (Beta Release)*

**Author** Russell Borland  
**Publisher** Microsoft Press  
**Price** £18.49

Oh dear. As if it weren't bad enough that we are bombarded with beta copies of software from the likes of Microsoft, we now have to contend with beta books too! The thing even opens with a paragraph headed "Limitations", where it presents half a page of legal waffle along the lines of "information contained herein should not be interpreted to be a commitment on the part of Microsoft", and that "Microsoft cannot guarantee the accuracy of any information presented after the date of publication". The bottom line is that anyone who buys this book to find out more about the Win98 beta product may well be faced with the prospect of buying another version of the book when the final code is released. Oh well, *c'est la vie*.

Having got that out of the way, the book itself, as an introduction to the features of Windows 9x, is not at all bad (and is certainly reasonably priced). The opening chapter is a fairly predictable, but nevertheless useful, list of the new features. After that, the book takes you through the Windows 9x interface (including the new Active Desktop), Internet Explorer 4.0, NetShow 2.0 (network broadcasting), NetMeeting 2.0 (conferencing and application sharing), Windows Messaging (including Outlook Express) and web authoring (with FrontPad).

For those interested primarily in networking, I am afraid you get only about 40 pages out of the 440, and no real detail. A lot of it reads more like marketing literature than true reference or tutorial material. Unfortunately, the same level of coverage is given to printing, communications, mobile computing services and multimedia services.

The final section of the book is given over to hardware and software support, starting off in an easy-to-understand manner, with excellent coverage of the base system architecture followed by chapters on plug-and-play, display support, device support, language support, robustness, systems management and the TV Viewer. There is twice as much about the TV Viewer as there is about Systems Management, but a measly five pages on user profiles and system policies is simply not good enough.

If you don't already have a book entitled Introduction to Windows 95, this particular tome is a reasonable grounding in Win9x technology and provides a useful early look at all the new features to come in Windows 98, even if it lacks any real nitty-gritty detail. However, if you do have some Windows 95 books lying around, there is an awful lot of that information which will be duplicated here, so you might be better off reading a few in-depth magazine reviews to glean details of the new features in Win98. For anyone looking for coverage of networking topics, you should leave well alone.

■ *My thanks to Computer Manuals (0121 706 6000) for keeping me supplied with review copies.*



So there you are: a couple of heavy-duty tutorials in successive months. If you can work your way through them, you should have everything you need to configure a TCP/IP network with "self managing" addresses.

Of course, if all you have is a relatively static network with three or four IP addresses, then you don't have to worry about DHCP. In such cases, I certainly would not recommend implementing it just for the heck of it, unless you enjoy risking the wrath of the "God of The Blue Screen

Crash". However, if your IP addresses change on a regular basis, or, like me, you frequently add, remove or swap clients around on your network and you have more than a few IP addresses to manage, then DHCP could be just what you're looking for.

## PCW Contacts

Bob Walder can be contacted via the PCW office (p12) or email [networks@pcw.vnu.co.uk](mailto:networks@pcw.vnu.co.uk)

Computer Manuals 0121 706 6000

# The healthy option

Don't suffer system crashes, software crises, backaches, headaches and RSI — follow Lynley Oram's advice for improved PC reliability and performance, as well as your personal comfort.

**O**f you want to get the best performance from your PC, it will help if you keep an eye on various aspects of your system setup. And it will do your personal performance no end of good if you make sure that you are comfortable when sitting at your PC. We're talking about ergonomics and the art of computer maintenance.

## Hard times

Let's start with your hard drive. Good housekeeping in this area is vital if you've been using your PC for a while. However, if you only got your PC last month, then cut the next section out and keep it for future reference — you can skip straight to the bit about ergonomics.

The hard drive, or disk, is important when it comes to getting the most out of your system. Most people think of the hard drive as merely a storage area for data and applications. But under Windows, the hard drive is not only a passive storage area, it acts as a swap space for data which Windows continually moves in and out of memory depending on system requirements.

Now may be the time to do a "clean-out" of your hard drive and get rid of all the rubbish accumulated there. The easiest way of freeing up space on your hard drive is to regularly delete any data files or applications which are no longer needed.

Some software programs come with their own uninstall procedure. Or, if you are using Windows 95, you can use the Add/Remove New Hardware wizard, which you will find in the Control Panel by double-clicking on the My Computer icon.

Unwanted files and folders can be removed using File Manager (in Win3.1) or Windows Explorer (in Win95). To search for files of a certain type, use the View menu or the Search/Find command. For example, type in \*.tif if you want to look for that type of graphic file, or \*.doc to locate all Word document files.

In particular, look out for graphics files (they are easily created and then forgotten) as they are hungry for disk space. Also look at the help files on your system — these

have the .hlp extension. Help files can occupy an enormous amount of disk space but only remove them if you don't need them any more. That goes for any "spring cleaning" you carry out.

Next, look for temporary files. These are files with the extension .tmp or .swp and begin with a tilde (~). In Windows 95, using the Windows Explorer, you will find these in the Windows folder nested in another folder called Temp. Temp files are like plaque on your teeth — you'll be surprised at how quickly they can build up. If you are using Win3.1, these must be deleted using DOS when Windows is not running.



your application software or by accidentally turning off your machine while a program is running. This is

**The defragmenting tools in Windows 95 (left) can be run at the same time as other applications**

**In Windows 3.1 (below) they must be run from DOS**

Most temporary files are stored in the TEMP directory, which is identified in your AUTOEXEC.BAT file by the line:

```
SET TEMP = path
```

## Scandisk and defrag

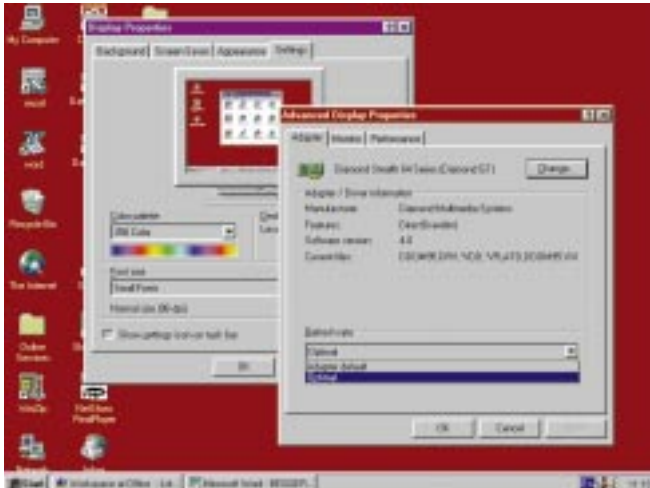
How often do you run a scandisk or defrag your hard drive? I know these are as interesting as watching paint dry, but they should be used regularly if you want to keep your PC happy: the way that files are stored on a disk is complex and it can go wrong.

Imagine your hard drive is a library and the information stored on it is the books in that library. You'll be familiar with the index system which libraries use to help you find



where scandisk and defrag come in handy. Both these facilities are supplied with MSDOS version 6.0 and upwards.

The first, scandisk, recovers and removes files which have become lost. The second, defrag, improves hard disk performance by defragmenting files or moving them into continuous blocks. It's rather like the librarian having a tidy-up of the shelves, and is recommended after a



**To minimise screen flicker, you should adjust your monitor's refresh rate. To do this in Windows 95, right-click on the desktop, click on the Settings tab, and click on Advanced Properties**

equipment suppliers. These allow the height of the screen to be adjusted, and it's important when evaluating such systems to ensure that they are strong and stable. Alternatively, try using various stable objects: this may be a good place to store back issues of *PCW*, for instance!

If your screen is too high and it's sitting on top of the system's desktop case, move the system case; there may be sufficient space beneath your desk. Alternatively, raise your chair and get a foot-rest.

### Refreshing change

Refresh rates is one area which just cannot be over-emphasised. Your computer is constantly redrawing the picture on your screen and if this is done fast enough, your eye won't detect any movement.

The speed at which the picture is redrawn is known as the refresh rate and is measured in the number of complete redraws per second, or hertz (Hz). If that isn't set high enough, and really it should be set at 75Hz or higher, then your eye may detect a flicker which can cause nausea and headaches. If you have the choice of interlaced or non-interlaced, go for the latter, as it draws a complete screen per refresh cycle.

In Windows 95, right-click on the desktop and go to Properties. In the Display Properties box, click on the Settings tab. Click on the Advanced Properties button. In the Adapter tab, there will be a drop-down menu called Refresh Rates and there should be a range of refresh rates available, although there may only be two options — Adapter Default and Optimal.

Thanks to plug-and-play, your PC, given the name of your monitor, will think it knows the best refresh rate. This is not always reliable, so if you're still not happy with your refresh rate even if it is set to optimal, you could try changing the monitor. In Advanced Properties click on the Monitor tab, hit Change and select Show All Devices. Here, you could select a type of monitor that you know will give you a good refresh rate: for example, an NEC Multisync 4FG will support a resolution of 1,024 x 768 at 75Hz non-interlaced.

bout of spring cleaning.

Under Windows 95, both of these are located in the Start Menu: go to Programs, Accessories, System Tools. Before DOS version 6.0 this kind of maintenance was carried out by "chkdsk". This command is still in DOS, but it is not as sophisticated as scandisk when it comes to recovering data.

Don't wait for something to go wrong before defragmenting your hard drive. It is a procedure that should be carried out regularly, otherwise the increased fragmentation will begin to have a dramatic effect and slow your system's performance.

Data is stored in a logical order on your hard drive, so the processor can access it as quickly as possible. Nevertheless, over time the data becomes fragmented. This means it is stored in several areas on the hard disk, although it will still be treated as one file. Because of this fragmentation, the processor has to hunt about for data and make more movements to get hold of the file. Your data is safe, but this is not a healthy state in which to leave your hard drive. Windows 3.1 users will need to type the command "defrag" at the C: prompt and select the full optimisation option.

### Are you sitting comfortably?

According to the dictionary, ergonomics is "the study of the relationship between humans and machinery". Lately it seems to have become a buzzword. But don't write it off as some trendy fad, because it isn't. Ergonomics has a direct bearing on your life, health and future.

The ideal workstation is: a swivel chair on five castors, with your feet flat on the floor and your arms at a 90-degree angle over the keyboard. If the desk is too high or, like me, you're too short to meet both of these requirements, the most simple

remedy is a foot-rest. Any pointing device should be within comfortable reach, and a document holder is recommended for touch-typing.

Opinion is divided on the best keyboard/mouse/trackball and there is a frightening number of so-called ergonomic products on the market. Any ergonomics consultant will insist on putting the individual first: in other words, go for what feels right for you. I find ergonomic keyboards, the curved kind that divide in the middle, very comfortable and easy on the wrists. The best advice is to try these devices before you buy.

Generally, make sure you take regular breaks from your screen, and at least use a wrist-rest if you do a lot of typing. You won't actually notice the benefits from all of this, and that's a good thing: the best way to avoid wrist and back pain in the future is to take precautions now.

### The eyes have it

You don't need reminding that your eyes are precious and you only get one pair. And because of the amount of time you spend in front of a screen, the monitor has a very important place in the ergonomics of the workplace.

A monitor should have a stand which can tilt and swivel — it's rare these days to find one that doesn't. First, make sure your screen is positioned with a slightly upward tilt so that you are looking slightly down at the screen. Next, swivel the monitor about until you find a comfortable working position, one which minimises reflections on the screen from other light sources such as windows and overhead lighting.

If you are having trouble getting your monitor to the right height, you can get special platforms from a number of office

## PCW Contact

Lynley Oram welcomes feedback and suggestions from readers. Email her at [beginners@pcw.co.uk](mailto:beginners@pcw.co.uk)



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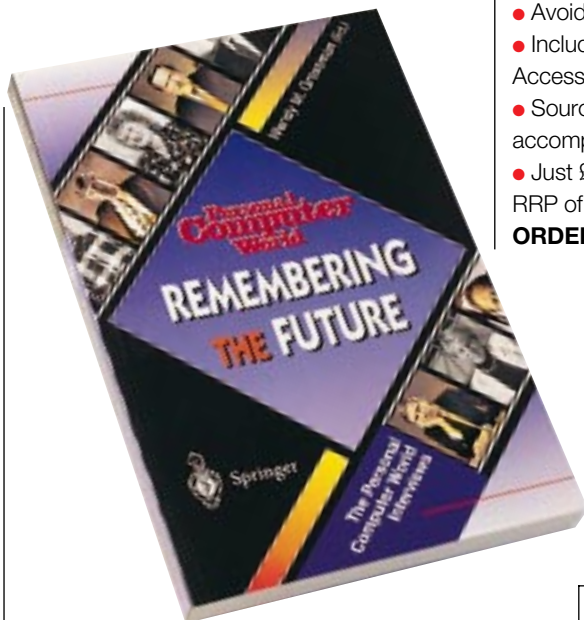
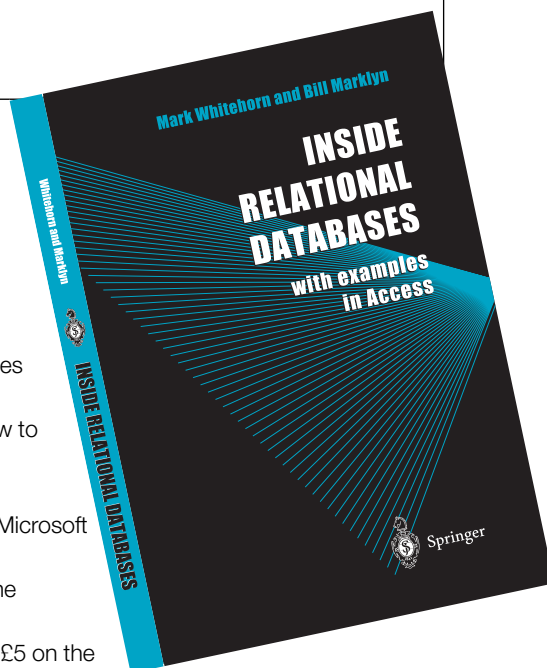
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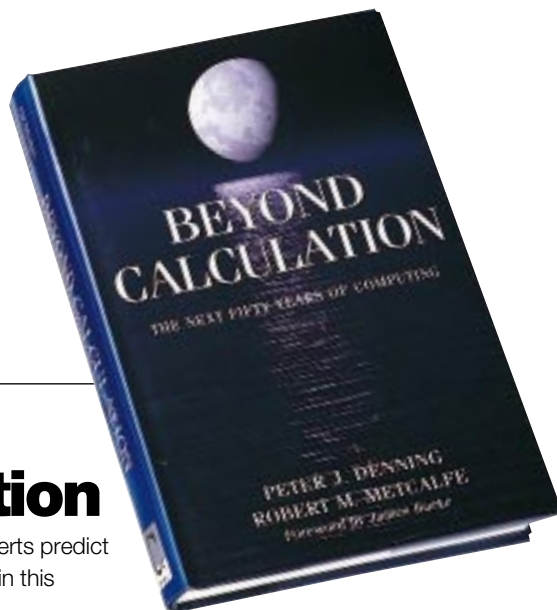
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# Tomb Raider 2



Lara Croft returns — globetrotting, meaner and more agile.

**L**ara Croft has been many things in the past year: from software's biggest star on the cover of *The Face*, to U2's playmate, to *FHM*'s cover girl in the form of "Lara" Rhona Mitra, and more. Tomb Raider 2 (TR2) returns us to what Ms Croft does best: running, exploring and shooting, while not wearing many clothes.

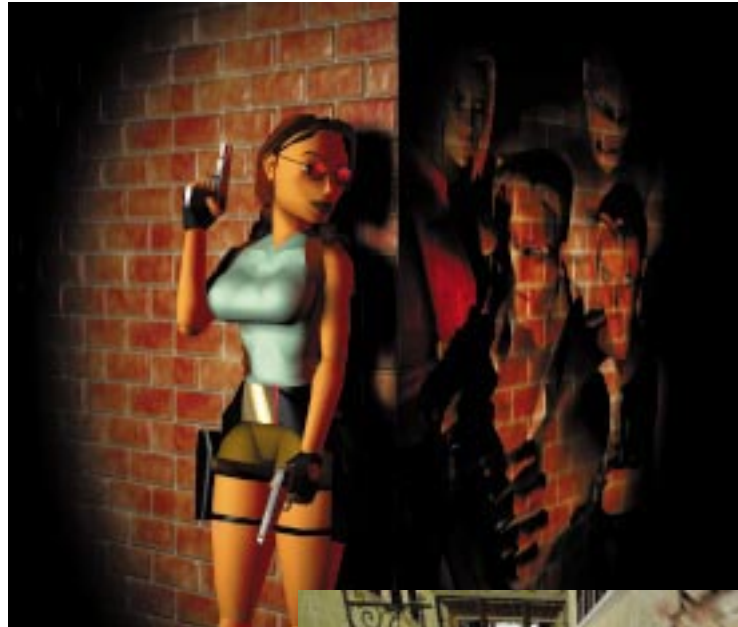
As the divine Ms C you are searching for the mystical dagger of Xian which, æons ago, belonged to an evil overlord. If the myth is true, then striking yourself with the dagger will give you supernatural powers. A sinister cult, "Fiama Nera", has sprung up around the dagger which is hidden in a vault in the overlord's ancient palace, waiting for the chosen one to release it with the right key. Lara's search for the key takes her from the Great Wall of China to Venice, through a spot of deep-sea diving to exploring a sunken galleon, and on to Tibet and treasure!

Instead of lurching into the game unprepared, there is the option to hone your skills on a purpose-built assault course at Lara's stately mansion, before exploring the rest of Ms Croft's palatial residence. Our unfeasibly proportioned heroine talks you through the moves you need, as well as introducing some new ones. There are still the graceful somersaults and flying leaps of before, only now Lara can also climb walls. The controls seem a little more refined than before, although the handling of delicate moves still seems a little ponderous at times.

If you haven't played the original, now is your chance to practice the intricate moves you are going to need later. There's no point getting started if you don't know the basics: for example, not knowing how to back-flip while climbing walls in Venice will scupper any chance you may have of progressing.

TR1 was mostly confined to the interior of the temple which Lara had to explore, but this sequel is out in the open air. And along with mountainous terrain and deep-sea exploration, there are urban settings like the episode on the waterways of Venice. This is where Lara's other new skill comes in handy: she can drive anything from motorboats in Venice to skidoos on icy wastes.

The Venetian canals are particularly fun: you can wreak havoc on gondolas and



**Left**  
Lara Croft, the reason polygons were invented

gunmen alike, and explore the underground cisterns and their geographically-improbable waterfalls. Our heroine can't shoot from the motorboat but this is compensated for by the skidoos with side-mounted machine-guns which Lara uses while in Tibet.

TR2 is as demanding as it is machiavellian and there are hernia-inducing moves to be made every other minute. Working out the timing is a relative cinch compared with finding out where to jump from/what to pull/what to push and when to duck and roll. To appreciate all those polygons and the speed with which they move, use the new feature of a swooping point of view around Lara to look around, below or above her.

Another change that makes a lot of difference to gameplay is the number of Uzi-packing goons you encounter. Compared to the solitary adventuring of the first game, TR2 is positively bustling with bad guys, Tibetan warrior monks and wild animals.

There are those who say this increased body count is an attempt by Eidos to net those shoot-em-up fans who wouldn't otherwise go for a more thoughtful game,



**Below**  
Feel free to wreak havoc and disrupt the gondoliers' trade

TR2 being as much about busting heads as scratching them. Of course, Lara's perfect polygonal pins, wafer-thin waist and a chest that would have puzzled Isaac Newton himself, certainly won't harm sales. If it took you months to complete Lara's first adventure, you'd better cancel those holidays — you could be stuck on this until the next millennium.

Paul Trueman

## PCW Details

**Price** £39.99

**Contact** Core Design 01332 297797  
[www.eidos.com](http://www.eidos.com)

**System Requirements** Windows 95, 16Mb RAM, 4X CD-ROM, P90 (P133 recommended), DirectX 5.0-compatible SVGA graphics card, 16-bit sound card.

★★★★★

# Blade Runner

The gamester's cut. Will the cult film spawn a cult game, too?

**R**eleased way back in 1982, Blade Runner, the film, met with indifference. But as with all cult successes, the reputation of the film has grown; so much so that Blade Runner, the game, is considered to be a going concern 15 years on.

Your character is rookie "Runner" Ray McCoy who must solve a series of cases in order to progress. The more cases you solve, the more of futuristic Los Angeles you get to see, flying in your patrol car between the LAPD precinct, your apartment and the replicant lowlife.

Blade Runner is on four CDs and a full installation will set your hard drive back a punitive 1.5Gb, although you can survive on the bare essentials with 170Mb. As you might expect from a game with four CDs, this is a vast software experience, with stunning graphics, ambient sound and speech, and



over 70 motion-captured characters, some of whom reprise their roles from the film. And here there's another treat: you can interact with the characters and visit rainy Chinatown or the angular Tyrell Corporation.

Blade Runner plays like the film. Nothing happens for long periods, yet never before has "nothing" happened with greater aplomb: the ambience, visuals and music are faithful to the film, and the plot can take

Sharpen up your skills and rout those replicant lowlives

numerous alternate routes. Help the replicants if you wish, choosing what evidence to share with fellow cops, or bump off unhelpful witnesses and get a reputation as a bent cop. If you have a robust PC and days to spare, this is a game to go for.

Paul Trueman

## PCW Details

Price £44.99

Contact Virgin Interactive 0171 368 2255  
[www.westwood.com](http://www.westwood.com)

System Requirements Windows 95/Windows NT 4.0, P90 (P133 recommended), 16Mb RAM, 2Mb graphics card with DirectX 5.0 drivers, 4X CD, 16-bit sound card, mouse.

★★★★

# Jedi Knight-Dark Forces II

Harness the Force: wield your Jedi light-sabre for good or evil.

**I**f you didn't know the Star Wars legend, it would be easy to dismiss Jedi Knight as just another Quake-a-like. The basic premise is simple: wander around a 3D world blasting virtually everything you see. Stormtroopers die and leave you their rifles, and you can pick up anything from a concussion rifle to a real light-sabre (every boy's dream!).

The sabres are different to those seen in early eighties' playgrounds as they really glow and, impressively, the graphics allow the light to be mapped to the movement of the blade. Ward off a blow, guard against the blast from your enemies' weapons and use it to kill them, too. That is, as long as you are mastering the lore of the Jedi. You must explore Kyle Katarn's past — in particular, the fate of his father.

Inevitably, there's a personal conflict to resolve. The Force (source of a Jedi's



strength, according to the Yoda) has both dark and light sides. Kyle's powers can follow one side or the other and there are Seven Dark Jedi who want to boost their own powers by raiding the Valley of the Souls, an ancient Jedi burial ground. The dark side, which you unlock by killing defenceless civilians, gives you tremendous destructive power, while the light side, the one you know you *ought* to follow, presents

The light from your sizzling light-sabre is mapped to the movement of the blade

more of a challenge.

Whichever side you choose, you can enjoy this game as a simple blast-em-up, especially if you choose to fight your friends using the multiplayer option, or as a serious extension to the Star Wars canon. Fight on, Jedi — and may the Force be with you!

John Sabine

## PCW Details

Price £44.99

Contact Virgin Interactive 0171 368 2255  
[www.lucasarts.com](http://www.lucasarts.com); [www.starwars.com](http://www.starwars.com)

System Requirements Windows 95, P90, 16Mb RAM (32Mb recommended), 2X CD-ROM drive (4X recommended), 33Mb hard disk space to install plus 20Mb swap file. SVGA graphics card, 16-bit sound card. Requires DirectX 5.0.

★★★★★



p326 >

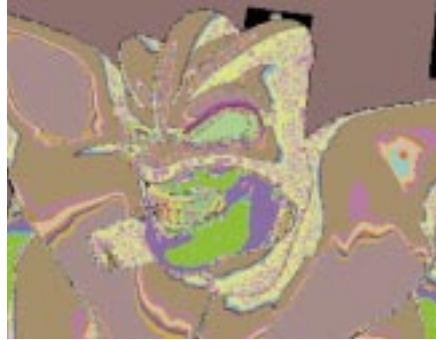
# Goosebumps

Get sucked into *Attack of the Mutant* — it's life as a comic strip.

**L**ooking for a game for your kids? Well, if they like comic books and fancy being pulled into the picture, then they might find this game exciting — but don't count on it. Although we reviewed the first Goosebumps game, *Escape from Horrorland*, a few months ago and were seriously impressed by it, *Attack of the Mutant* is lacking in many areas.

It is about a child, who is supposed to be the player, reading a comic on the school bus one morning. The bus comes to a stop. You get off the bus and suddenly, your surroundings turn into those of the comic — "Attack of the Mutant".

The goal, according to the manual, is to "...join forces with the League of Good Guys to stop the Mutant from turning the world into a giant comic book." Hmm... OK, so what does that mean? Not a great deal. Essentially, you just wander around a castle



picking up clues and trying to solve puzzles without really knowing why you are doing it.

It lacks the personal touch of *Escape from Horrorland*, where Lizzy would stop to have a chat with you and guide you in the right direction. You and Lizzy were mates in a funny kind of way, as you were helping her to find her lost family. In *Attack of the Mutant* you are solo, playing a nameless character trying to save the world from... a comic

The mutant menace will try to turn your world into a comic book

book. It's just not right. The animation is great, but the game isn't scary. *Goosebumps* is supposed to have you quaking in your boots.

If it's a thrilling, spooky little PC game you're after, stick with *Escape from Horrorland*. Your kids will thank you for it.

Etelka Clark

## PCW Details

Price £29.99

Contact Microsoft 0345 002000  
[www.microsoft.com](http://www.microsoft.com)

System Requirements Windows 95/Windows NT 4.0, P75, 16Mb RAM, 25Mb hard disk space, SVGA graphics card, 16-bit sound card, CD-ROM.

★★

# Grand Theft Auto

Naughty, but nice: shocking, high-speed fun on four wheels.

**G**rand Theft Auto is the sort of lurid, violent, sinful software that every right-thinking person would do well to condemn and ensure their children are never allowed to play. If I could stop myself playing the damn thing for long enough, I'd be right with them.

You are the member of a gang struggling for supremacy in a massive sprawling metropolis. You are given orders by your bosses, beginning with lowly car hijackings and drug-dealing. If you meet with success — killing innocent people, violating traffic laws — you will be rewarded with better jobs and your legs won't get broken!

The original soundtrack is a pleasant surprise and the game is highly enjoyable. Although the city seems to have an excellent public transport system, it is advisable to "car-jack" a fast, sporty number if you don't want to look soft in



Reckless renegades running the streets

even think about using the street maps, such is the speed of some of the cars.

Despite its vicarious illegal thrills, *Grand Theft Auto* is basically about driving as recklessly but as stylishly as possible. It's unlawfully enjoyable.

Paul Trueman

front of your gang. Unless you have a "3DFX" card, you will have to settle for the "High-Colour" game, a riot of colours moving at extreme velocity. The overhead point-of-view swoops in and out of the action flawlessly, depending on what's happening below, and the speed at which you must drive ensures a giddy sensation after only 15 minutes of gameplay. Don't

## PCW Details

Price £44.99

Contact SKS 01373 455999  
[www.bmginteractive.com](http://www.bmginteractive.com)

System Requirements DOS/Windows 95, 486DX4/100MHz, 16Mb RAM, 512Kb VESA-compatible SVGA graphics card, 16-bit sound card.

★★★★



# Books

The Which? net guide is a cracking read and tells you all you need to know: *and you can win a copy*. Plus, Dilbert looks to the future.

## The Dilbert Future: Thriving on Stupidity in the 21st Century

■ We've probably all noticed the usual career path of famous cartoonists: they become well known, make tons of cash, and publish a book of their old cartoon strips and make even more money.

The likes of Jim Davis (Garfield) and Garry Trudeau (Doodles) have trodden this route, and now it's the turn of Scott Adams again, with his latest book, *The Dilbert Future*.

Mind you, the book isn't as bad as my cynicism. It's actually quite funny. Adams has managed to maintain his quirky but oh-so-true view of life in the office, with a bit of democracy, sex and technology thrown in for good measure. Interspersed throughout, of course, are the comic strips featuring the trials and tribulations of Dilbert

and his switched-on pet, Dogbert.

The book is based around his predictions for the future. Some are completely absurd. Prediction 29, for

instance: "In the future, religious groups will get mad at me, thus boosting my book's sales." Or there's Prediction 12: "In the future, ISDN services will improve to the point where you can mention it in a crowd without generating laughter." His predictions make you laugh, but in that nervous way you do when you see someone slip on ice — it's humorous to watch, but the truth is, it's

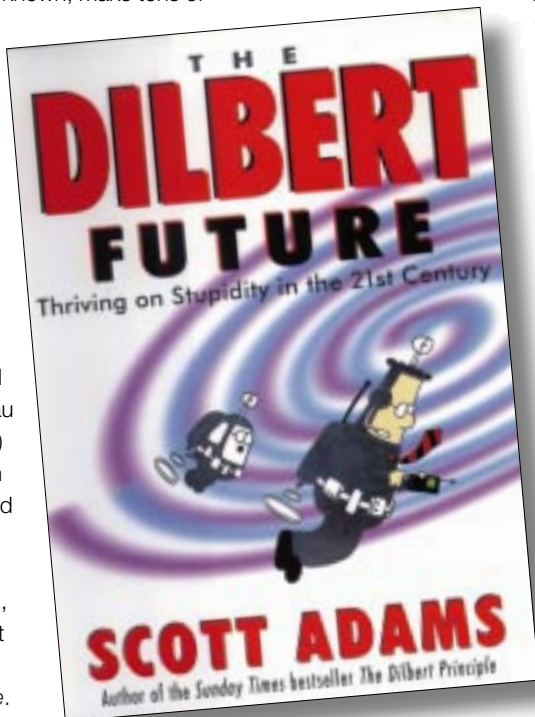
not supposed to be funny.

Adams also provides serious observations throughout the book which, perversely, allow you to relax a little after having found yourself agreeing with his dark and ironic views.

*The Dilbert Future* is a must-

read for anyone who works in an office setting, because it's funny and, alarmingly, so very true.

Dylan Armbrust



## ■ The Which? Guide to the Internet

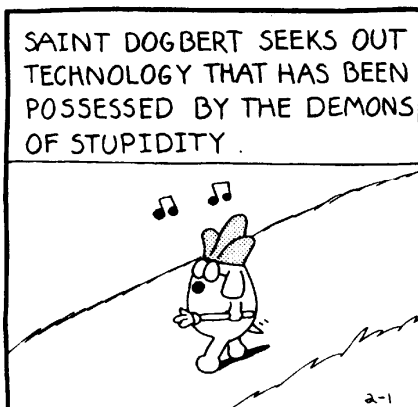
What with Hollywood featuring the internet at every turn, bookstores with whole shelves devoted to the subject and the broadsheets producing weekly online guides, there must now be fewer people unaware of the net than there are Brits in the Chelsea First XI. Then again, the Which? team is the nation's most reliable consumer guide this side of Anne Robinson on Watchdog.

Most internet guides are content to laboriously explain why the global network started and which buttons to press to install Netscape's plug-ins. But *The Which? Guide to the Internet* is more concerned with what this all means for consumers, whether or not they are first-time buyers.

This book covers the sort of topics that will be useful for the average internet consumer, and it's surprising that more

## Win a Which? Guide to the net

Which? Software has 30 copies of the *Which? Guide to the Internet* to give away to PCW readers. Simply send in your name and address on the back of a postcard or sealed envelope, and address it to PCW, Which? Guide to the Internet Competition, VNU House, 32-34 Broadwick Street, London W1A 2HG. The first 30 entries received will be sent a copy of the book by post.



## Top Ten Books

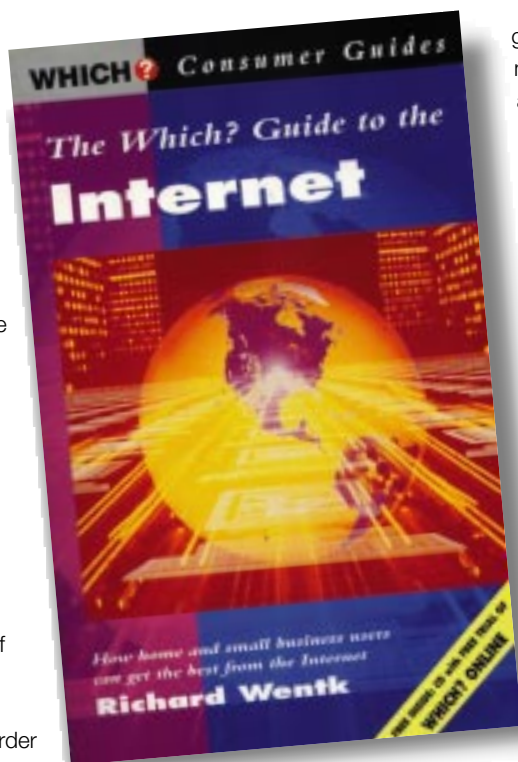
1	The Internet & World Wide Web: The Rough Guide 1998	Rough Guides	£5.00
2	C++ Programming Language, 3rd Edition	Addison-Wesley	£27.95
3	Java Examples in a Nutshell	O'Reilly	£14.95
4	Windows NT in a Nutshell	O'Reilly	£14.95
5	Java in a Nutshell, 2nd Edition	O'Reilly	£14.95
6	UML Distilled: Applying the Standard Object Modelling Language	Addison-Wesley	£23.95
7	Software Project Survival Guide	Microsoft Press	£22.49
8	Word Annoyances	O'Reilly	£21.95
9	Inside Microsoft SQL Server 6.5	Microsoft Press	£46.99
10	COM & DCOM	Wiley	£27.50

Prices include VAT on disks and CD-ROMs. List supplied by The PC Bookshop, 21 Sicilian Avenue, London WC1A 2QH. Telephone: 0171 831 0022. Fax: 0171 831 0443

writers aren't covering this area. For instance, most guides treat the choice of ISP and modem as *de-facto* choices already made by the user. Yet here we get a chance to see the differences and relative merits/drawbacks between raw connections and online services such as AOL, as well as a series of questions you should be asking support staff in order to get the best from your net connection.

Concentrating on cost effectiveness for both the home and business user, Richard Wentk's guide comprehensively explains the mechanics, advantages and pitfalls of email packages, newsgroups, netiquette and the constantly shifting sands of security concerns and bandwidth. What is remarkable is that the book never slips into technobabble or patronising explanations of the Back button. Instead it draws on illuminating and personal case studies and interesting net history, like the Church of Scientology/Newsgroup fracas, to get its point across.

The appendix is the book's mainstay, serving as a reference guide for more experienced users. Also included here is a brief introduction to HTML, technical information, and some handy reference books and sites. There are even up-to-date



guidelines about the new 56.6K modems and the validity of ISDN or satellite connections for business users, including speculative prices and advice on approaching web design companies.

This is one of the most useful internet guides around: packed with easy-to-read advice and some good case studies to ensure you get the best out of your time

online. A net guide

more concerned about your needs than those of your PC. A Which? Online trial CD is included in the price.

Rob Venes

## PCW Details

**The Dilbert Future: Thriving on Stupidity in the 21st Century**

**Author** Scott Adams

**Publisher** Bantam

**ISBN** 0-7522-1118-8

**Price** £12.99

★★★★

**The Which? Guide to the Internet**

**Author** Richard Wentk

**Publisher** Which?

**ISBN** 0-85202-683-8

**Price** £9.99

★★★★



# What's on the **Agenda?**

The Microwriter keyboard offered the unique opportunity of touch-typing on a PDA. Today, only Psion comes close to it.

**T**he Microwriter Agenda was born to good parents: one was the product's designer, Cy Endfield, the other was respected city banker, Sir Mark Weinberg. But let's start with the Agenda's elder brother. Born in 1979, this machine was a big, ugly child that had few admirers. It was an organiser with no word-processing features but with one unique family trait — the Microwriter keyboard.

If you've never seen a Microwriter, let me explain. There are just five keys, arranged in an ergonomic pattern. You rest your fingers on the keys and each character is entered using a different combination of key presses, called chord keying. The manual suggested that the user imagine these combinations as describing the shape of the character. This strategy worked, and after a few days of practice most users could touch-type at reasonable speed by pressing the combinations. The first model was not a raging success, so the company produced an add-on chord-key keypad for the then phenomenally successful BBC Micro. Meanwhile, in the background, the team worked on a new design.

In 1989, the new-born Agenda arrived in the world. The full course of cosmetic surgery had worked and we had a sleek, rather sexy matt-black handheld unit which promptly won the UK Design of the Year award. It was about the size of a modern-day Psion, but deeper and heavier. It continued the family name by using a unique five-fingered Microwriter keyboard, but added a tiny keyboard and a numeric keypad for financial work.

The Agenda sported an LCD screen which could display 20 characters across and four lines down. It sounds cramped and small now, but back in the digital watch inspired days of the early nineties, this was good visual acreage. The basic model was supplied with 32 or 64Kb of main system RAM which could be expanded by memory cartridges. The processor powering this machine remains, unfortunately, a mystery: I've tried to find out by looking on the



casing of my old model but cannot see any clues. However, I can reveal that the rival pocket computers of the time were running 8088s, the 8-bit processor that made Intel rich and drove a million IBM PCs.

Rival PDAs (Personal Digital Assistant) of the time included Atari's long-forgotten Portfolio, and the Poquet. But although these units would not have looked odd to today's user and had a traditional-style keyboard, they lacked the unique Microwriter keyboard of the Agenda.

If you build up the touch-typing feature, you have to make sure that the software is up to the job. Agenda's built-in applications included a reasonable word processor (more of an editor by today's standards) which allowed basic text formatting, pagination and editing using Microwriter key strokes. Other utilities included a calculator, a diary and an address book. You could upgrade the calculator software to a sophisticated financial planner designed by Sir Mark himself. After a few months, the company launched a BASIC-style language that allowed programmers to fashion their very own Agenda utilities.

Unlike most PDAs, including today's crop of delights, the Agenda was pretty useful as a way of taking notes. I remember one computer journalist who would sit at the back of a press conference and take down everything he needed by twitching over the five-key pad. Being young and

easily impressed, I thought this a great idea and tried to do the same, but spent most of my time trying to recall the key combos and missed the crucial facts.

If you took the time to learn the key combinations, the Agenda had the distinction of being a PDA which would allow touch-typing: no crouching over the dull screen, just a few wiggles of the fingers and the words would flow.

The touch-typing business is a serious limitation in today's PDAs, and only Psion has got close to cracking it with the keyboard on its model 5.

Generally, the Agenda was a mixed success. As a unique, stylish accessory it was hard to beat. It was reasonably priced, had all the features you might want and could link up to any PC or Mac. Yet it still did not really catch on. After a year, just 12,000 units had been sold. Microwriter launched an add-on fax modem, but with its limited screen, composing a fax was a painful experience. It boosted the available software, but this didn't trigger massive sales. Chief designer Cy Endfield died in 1995, but the chord-keying dream lives on with Bellaire Electronics which supports the Agenda and develops new products.

In the end, the unique keyboard was the birth and death of the Agenda. Everyone talked about the keyboard and ignored the bigger achievements. Microwriter had launched a PDA which could accept touch-typing, had a full complement of good financial and text applications, linked to any standard desktop and could be expanded using the programming language.

I guess it was ahead of its time; now, we are used to the foibles of PDAs and put up with more than we realise. The Agenda was different from the norm and, like all such products, rather misunderstood. ■

Simon Collin

# Win an **HP Pavilion** PC

And to help you look good in print, HP is also giving away a fabulous DeskJet 690C colour printer, and is throwing in a 12-month email account with UUNET's-PIPEX Dial. It could be you!

**O**ne of PCW's New Year resolutions is to carry on giving our readers the chance to win great prizes every month. And this month, Hewlett-Packard is giving readers the chance to win a great first prize, an HP Pavilion 3120 PC, an HP DeskJet 690C printer and a free 12-month email account with UUNET's-PIPEX Dial.

The Pavilion 3120 is worth £1,199 (inc VAT) and comes with a 15in monitor, Intel 166MHz and MMX 166MHz processor, and built-in fast fax and data modems. It comes bundled with Microsoft Works for Windows 95, and educational and entertainment software including Infopedia by the Learning Company, FIFA 97 and SimCity 2000. 3D stereo speakers are also part of the package.

This PC is perfect for the home. Equipped with HP PhotoSmart imaging capability, you can develop and edit photographs and incorporate them into a wide range of documents.

HP Pavilion PC customers will receive 60 days' free software support on all pre-loaded software, including Microsoft's Windows 95.

The HP Pavilion 3120 works smoothly with other HP products including scanners, digital cameras and printers like the HP DeskJet 690C, worth £205 (inc VAT). This beautiful colour printer produces photographic-quality images

by using the optional photo cartridge and HP photo paper. The DeskJet 690C can print up to 5 pages per minute for black and 1.7 pages per minute for colour. It also includes Photo Resolution Enhancement technology (Photo-REt).

● Two runners-up will win a 12-month email account with UUNET's-PIPEX Dial.

■ **To enter this competition, just answer the following question:**

*How many days of free software support do customers get when buying an HP Pavilion 3120?*

**A** 40    **B** 50    **C** 60



For more information on Hewlett-Packard products, please call 0990 474747.

## Rules of entry

The competition is open to readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications and Hewlett-Packard. The Editor of *Personal Computer World* is the sole judge of the competition and his decision is final. No cash alternative is available in lieu of prizes.

## How to enter the competition

- Via our web site at [www.pcw.co.uk](http://www.pcw.co.uk).
- Or write your name, address and answer on a postcard, along with your daytime phone number. Mark your card with the correct name of the competition and send it to: PCW/February Competition, P.O. Box 191, Woking, Surrey GU21 1FT. Entries must arrive by **Friday 27th February 1998**.
- Please state clearly on your entry if you do not wish to receive promotional material from other companies.

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Use this form when you order by phone, fax or post.

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Details: .....

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# No-nonsense Buyer's



The *PCW* Buyer's Guide is packed with sensible advice about what to buy and how to buy it safely. Buying direct through our pages can save you hundreds of pounds, but do stick to our 12-point guide to buying direct.

## Twelve rules for buying safely

1. Always use a *PCW* order form.
2. Keep the original advertisement.
3. Keep copies of all correspondence. If you speak on the phone make a note of to whom you spoke.
4. On large orders, obtain a written quotation.
5. If possible, pay with a personal credit card. All transactions over £100 should be covered by the card company's insurance scheme.
6. Does the price quoted include everything discussed? Is VAT extra?
7. Check how the supplier will deliver and whether or not delivery times are guaranteed.
8. Is free telephone technical support included in the price? Some suppliers offer support only on premium 0891 numbers. Is it easy to get through? Try dialling the number to test it out.
9. Is the warranty return-to-base or onsite? "Return-to-base" means that you'll have to pay to ship the product back to the supplier.
10. If you're paying extra for online support, does the manufacturer offer guaranteed response times? If you rely on your PC for your business you'll need it fixed, pronto.
11. Is the supplier reputable? Does it comply with BS5750 or ISO9000? If in doubt, ask to see customer testimonials.
12. When your PC arrives, check that all branded components are genuine.

## Buying a PC

PCs get cheaper and faster all the time and your state-of-the-art PC can quickly become outdated. That may not matter, though, if it still does what you require. But if you're buying a new general-purpose PC now, it should be fitted with a CD-ROM drive, sound card and speakers so that you'll be able to play games and run a wide range of modern software.

## Minimum specifications

- It is a false economy to buy a new PC with less than 16Mb of RAM. The jump from 8Mb to 16Mb of RAM makes a huge difference to performance.
- Ensure Pentium motherboards have an Intel Triton 430 VX, HX, TX or compatible chipset.
- Avoid 14in monitors. The difference between 14in and 15in doesn't sound much but means the screen is 15 percent smaller. If you can afford it, buy a 17in monitor.

## Other things to consider

Most small PC manufacturers buy their motherboards from Taiwanese or far eastern manufacturers. Larger companies either design their own motherboards (e.g. Apricot, Compaq, IBM) or get motherboards built to their specification (e.g. Gateway). Intel chips are no longer the only choice. AMD's K6 processors are well worth considering, too. It is amazing how hard disks fill up and it's unusual to have *too much* disk space.

Some suppliers offer you the choice of Windows 95 or Windows NT. For general home or small office use, Windows 95 is still the best choice. You may need to consider NT for some specialist applications like programming, DTP or CAD.

Practically every month, CD-ROM drives get faster. Higher speeds and bigger numbers just mean you can access files from them more quickly and that video clips on them play more smoothly.

Look closely at the software that's bundled with your PC. If you want an Office suite it's usually cheaper to buy it bundled with your PC. Software bundles can also be an excuse for manufacturers to unload piles of old or second-rate software. Check whether you get the original media if you need to re-install.

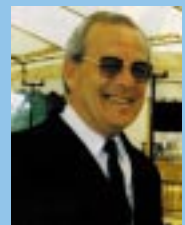
For this Buyer's Guide we've drawn up four specifications. We haven't mentioned particular manufacturers because you'll find up-to-date PC reviews in every issue of *PCW*.

## Personal Computer World Buyer's Charter

### If things go wrong

#### Mail Order Protection Scheme

Anthony George, our Customer Services Manager, is there to help you if things go wrong or if you have a complaint about advertisements that have appeared in *Personal Computer World*. Write to him with details of the complaint and he will contact you.



Anthony George

#### Buyer's Charter

When you purchase goods as a private individual from an advertisement appearing in this magazine and pay in advance of delivery, and that supplier ceases to trade and subsequently goes into receivership, liquidation and/or bankruptcy, you may be protected under our "Buyer's Charter", provided that you have:

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3. The "Buyer's Charter" will not safeguard any commercially-orientated outlet, neither will it cover goods which are purchased outside Great Britain or any goods which are obtained for resale.

## PCW Second-hand spec

Buying second-hand or discontinued kit is the cheapest way to get started. This is the minimum spec we think you should choose for general business use, playing games and accessing the internet.

- Windows 3.1 or 3.11
- DX2 66MHz 486 processor
- 8Mb RAM
- Graphics card with 512Kb of memory
- 200Mb hard disk
- 3.5in floppy disk
- CD-ROM drive
- 14in colour monitor

## PCW Minimum specification

This is the absolute minimum spec we think you should consider if you are buying a new PC. Suitable for general business use: word processing, databases, spreadsheets and, with a modem, accessing the internet.

- Windows 95
- 133MHz Pentium-class processor
- 16Mb RAM
- Graphics card with 1Mb of memory
- 1.2Gb hard disk
- 12-speed CD-ROM drive
- 15in colour monitor
- PCI local bus

## PCW Recommended spec

If you are not short of cash, this is the specification we recommend. No-one at PCW would settle for less.

- Windows 95 or Windows NT 4.0
- Pentium or equivalent 166MHz processor
- 256Kb secondary cache
- 32Mb EDO RAM
- Graphics card with 2Mb of memory
- 2Gb hard disk (modern computer software takes up a lot of space)
- 12-speed CD-ROM drive
- 17in colour monitor
- 16-bit SoundBlaster-compatible sound card

## PCW Best specification

This is as good a PC as you are likely to need for most software. For some specialist applications, like professional DTP or CAD, you may need even more memory, a bigger hard disk, a more powerful graphics card or a larger monitor.

- Windows 95 or Windows NT 4.0
- Pentium 233MHz MMX or Pentium II
- 512Kb secondary cache
- 32Mb EDO memory
- 4Gb hard disk
- 16- or 20-speed CD-ROM drive
- 17in colour monitor
- 4Mb VRAM or WRAM graphics card (this means your graphics card can display more colours, and at a higher resolution on your monitor: 16 million colours at a resolution of up to 1,280 x 1,024)
- 16-bit wavetable sound card

# Buying a Notebook

Notebooks belong in the one area in which it is often safer to stick to brand names. It is not so much that some of the Far Eastern kit doesn't work perfectly well, but reliability seems to be a problem and it can be fiendishly difficult to obtain spares. A useful guideline when choosing a notebook is to try before you buy.

Remember that standard notebook specifications are generally a step or two behind their desktop equivalents.

## What to look for in a notebook

- **Pointing device** There has been a move away from trackballs to trackpads. Some notebooks, notably IBM Thinkpads, use stick technology (a device which looks like the rubber on top of a pencil and is controlled by the use of one finger).
- **CD-ROM drives** These are rapidly becoming standard in notebooks. If your notebook is going to be your only machine, it's worth getting one.
- **Floppy disk drive** Often, there is a choice between a CD-ROM drive and a floppy disk drive. If the notebook is to be your only machine, make sure that the CD-ROM drive and the floppy drive can be used simultaneously.
- **PC Cards** Modern notebooks all have at least one PC Card slot. They take credit card-sized expansion cards which add a fax-modem, a network interface card or even an extra hard disk to your computer.
- **Battery life** Battery life varies, from as little as 30 minutes to over six hours. Lithium Ion and Nickel Metal Hydride batteries have now replaced the older NiCad (Nickel Cadmium) batteries.

- **TFT screens** TFT screens are of a higher quality than dual-scan or passive-matrix screens, using a sharper picture and no shadowing or ghosting.
- **Warranty** Drop a notebook and it may break, so it is vital to check the terms of your warranty. How long is it? What level of service is provided? Remember — better safe than sorry.

## PCW Minimum specification

Notebooks change quickly. It is possible to pick up end-of-line machines with Pentium processors from brand-name manufacturers like Toshiba and Compaq at discounted prices of £1,000 or less. These can be a very good buy. Just make sure they can run the software you need to use.

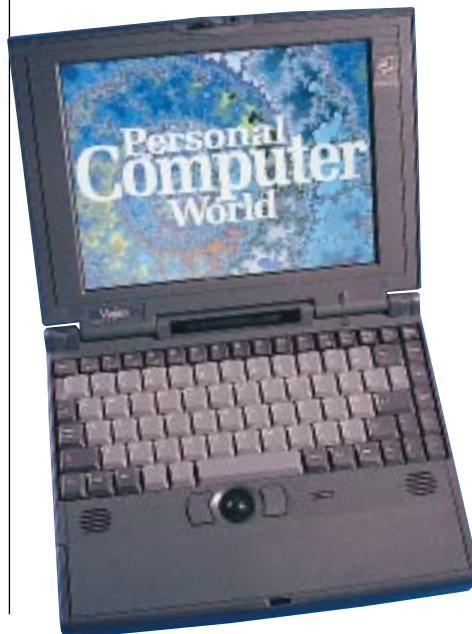
## PCW Recommended spec

- Windows 95
- Pentium 133
- Quad- or six-speed CD-ROM drive
- 16Mb RAM
- On-board graphics with 1Mb of memory, PCI local bus
- 850Mb hard disk, 3.5in floppy disk drive and/or dual-speed CD-ROM drive
- TFT 800 x 600 screen

## PCW Best specification

The state-of-the-art notebook: either you're loaded, or your company's picking up the tab.

- Windows 95 or Windows NT
- Pentium 166MMX
- 256Kb secondary cache
- 32Mb RAM
- On-board graphics with 2Mb of VRAM memory, PCI local bus
- 1.2Gb hard disk
- 3.5in floppy disk drive
- Eight-speed CD-ROM drive
- Active matrix 1,024 x 768 TFT screen
- Long battery life



# Glossary

## of computing terms

### A

#### Access time

The time it takes for a device to access data. The access time, quoted in milliseconds (ms) for hard disks and nanoseconds (ns) for memory, is usually an average as it can vary greatly. Together with the transfer rate, it is used to gauge the performance of hard disks and other devices. The lower the number, the better the performance.

#### Applications

An application, or package, is one or more programs used for a particular task. For example, word processing, invoicing or spreadsheeting. Applications are bought shrink-wrapped (wrapped in cellophane for general use) or custom-built for specific uses.

#### ASCII (American Standard Code for Information Interchange)

Usually a synonym for plain text without any formatting (like italics, bold or hidden text). Since computers naturally use binary rather than Roman characters, text has to be converted into binary in order for the processor to understand it. ASCII assigns binary values to Roman characters. RTF, a Microsoft standard, adds extra formatting features to plain ASCII.

### B

#### Backwards compatible

Compatibility of hardware or software to older versions of the product or standard.

#### Baud rate

The number of electronic signals that can be sent along a communications channel every second. In common usage, it is often confused with bits per second. These days modem speeds are normally measured in bits per second. (See V and Bit).

#### BIOS

Basic Input/Output System. Software routines that let your computer address other devices like the keyboard, monitor and disk drives.

#### Bit

Binary digit, the basic binary unit for storing data. It can either be 0 or 1. A Kilobit (Kbit) is  $2^{10}$  (1,024 bits); and a Megabit is  $2^{20}$ , which is just over a million bits. These units are often used for data transmission. For data storage, megabytes are more generally used. A megabyte (Mb) is 1,024 kilobytes (Kb) and a Kb is 1,024 bytes. A gigabyte (Gb) is 1,024Mb. A byte (binary digit eight) is composed of eight bits.

**Bug** (See Crash)

#### Boot

Short for bootstrap. Refers to the process when a computer loads its operating system

into memory. Reboot means to restart your computer after a crash, either with a warm reboot (where you press Ctrl/Alt/Del) or a cold reboot, where you switch the computer off and back on again.

#### Bus

A "data highway", which transports data from the processor to whatever component it wants to talk to. There are many different kinds of bus, including ISA, EISA, MCA, and local bus (PCI and VL-bus).

### C

**Cache** (See Memory)

#### COAST

Cache On A Stick.

#### CD-ROM

A CD-ROM is the same as a normal audio CD, except it can store data as well as sounds. A CD-ROM player can be attached to your computer to read information from the CD-ROM into the computer's memory in the same way that a domestic CD player reads information from the CD into your hi-fi. The advantage of distributing information on CD-ROM rather than other media is that each one can hold up to 680Mb of data: equivalent to about 485 high-density 3.5in floppy disks. The disadvantage, however, is that you can only write once on CD-ROMs, yet this makes them ideal for archiving.

**CISC** (See RISC)

#### CPU

Central Processing Unit. Normally refers to the main processor or chip inside a PC. (See Processor.)

#### Crash

Common term for when your computer freezes. Can be caused by a power surge, a bug (which is a fault in software) or a GPF.

### D

**DRAM** (See Memory)

#### DOS (Disk Operating System)

Once the standard operating system for PCs, it is now being replaced by Windows 95 and Windows NT.

#### DPI (Dots Per Inch)

Common measure of the resolution on a printer, a scanner or a display.

#### Drive controller card

An expansion card that interprets commands between the processor and the disk drives.

#### Drivers

Pieces of software that "drive" a peripheral. They interpret between the computer and a device such as a CD-ROM. If you have a SCSI CD-ROM drive connected, you will be able to use it on a PC or a Mac just by loading up the relevant driver on each machine.

### E

**EIDE** (See IDE)

#### EISA (Extended Industry Standard Architecture)

A bus standard designed to compete with MCA. Now being replaced by PCI.

#### Electronic mail (E-mail, email)

Still the biggest single use of the internet. When you sign up with an ISP you are given an email address. Usually you can incorporate your name, or part of it, into your email address to make it easy to remember.

#### Expansion card

Circuit boards which fit inside PCs to provide extra functionality. For example, one might be an internal modem, providing the same functions as an external version (which is more common) but sitting inside the PC. Expansion cards are designed to be fitted and removed by people with little knowledge of PCs.

### F

#### Floppy disk drive

Practically all PCs come with a floppy disk drive: 3.5in HD (high density) 1.44Mb floppy disks are now the standard. They come in hard plastic cases and have replaced the older, literally floppy, 5.25in disks.

#### Fonts

A font is an alphabet designed in a particular style. Fonts apply both to screen and printed letters. TrueType and Type 1 fonts are stored as shape descriptions, scalable to any size.

#### Format

To wipe a floppy or hard disk in order to prepare it to accept data.

### G

#### GPF

General protection fault.

#### Graphics card

An expansion card which interprets commands from the processor to the monitor. If you want a better, higher-resolution picture or more than your existing setup, you'll need to change your graphics card and/or your monitor.

#### GUI (Graphical User Interface)

(See Windows)

### H

#### Hard disk

Sometimes called a fixed disk, hard disks are hermetically sealed rigid disks able to store data and programs. Disk capacities increase all the time. The standard is now 1Gb but disks of up to 9Gb are available.

#### Hardware

All electronic components of a computer system, including peripherals, circuit boards and input/output devices.

#### HTML (Hypertext mark-up language)

The standard language used in the creation of web pages, which can be read by web browsers.

### I

#### IBM-compatible

Originally meant any PC compatible with DOS.

Now tends to mean any PC with an Intel or compatible processor capable of running DOS or Windows.

## **IDE (Integrated Drive Electronics)**

A control system designed to allow computer and device to communicate. Once the standard for PC hard disks, now being replaced by EIDE (enhanced IDE) which offers improved performance and extra features.

## **Internet**

Millions of computers interconnected in a global network.

## **ISP (Internet Service Provider)**

ISPs provide access to the internet. You use your modem to dial the ISP's modem. The ISP has a high-bandwidth permanent connection to the internet.

## **IRDA (Infra-Red Data Association)**

The standard for exchanging data using infra-red, typically from PDAs or notebooks to a PC or printer.

## **ISA (Industry Standard Architecture)**

This was the original bus architecture on 286 PCs. Also known as the AT bus (the 286 was known as the AT), it remains in use today. Slow by modern standards, but so widely accepted that expansion cards are still made for it. (See EISA, PCI.)

## **ISDN (Integrated Services Digital Network)**

Offers significant advantages over analogue telephone lines. It can handle multiple transfers on a single connection and is faster. In the UK, however, costs of installation and rental remain high.

## **J**

**JPEG** (See MPEG)

## **K**

**Kbit (kilobit), Kb (kilobyte)**

(See Bit)

## **L**

**LAN (Local Area Network)**

(See Network)

## **Local Bus**

PCI (Peripheral Component Interconnect), developed by Intel, is now the standard for local bus architecture. It is faster than the older VL-Bus (Video Electronic Standards Association local bus) it replaces.

## **M**

**Macintosh (Mac)**

A personal computer made by Apple and which is incompatible with PCs. Developed as a rival standard, its operating system looks like Windows but pre-dates it and (in some people's view) looks and works much better.

## **Maths co-processor**

A specialised chip that handles mathematical calculations (floating point operations) for the processor. Modern processors such as the Pentium have a co-processor built into them.

**Mbit (megabit)** (See Bit)

**Mb (megabyte)** (See Bit)

## **MCA**

A type of bus designed by IBM to beat EISA. Although faster, it never became popular: this was because every machine that used it had

to pay a royalty to IBM, and because it was not backwards-compatible with ISA.

## **MPEG (Moving Picture Expert Group)**

A standard for compressing video, available in several flavours: MPEG 1, MPEG 2, MPEG 4. JPEG (Joint Photographic Expert Group) is a standard for still image compression.

## **Memory**

The term normally refers to RAM (Random Access Memory). This is the kind which disappears when you turn off your computer and is much faster to access than a hard disk. It acts as a staging post between your computer's hard disk and its main processor.

● **Cache memory** Temporary memory set aside to store the information that is accessed most frequently. The Pentium processor has 8Kb of in-built cache. This can be further speeded up by a secondary cache, typically 256Kb. Part of your DRAM is often used to cache your hard disk.

● **DRAM (Dynamic Random Access Memory)** This requires its contents to be replaced every one thousandth of a second and is the most common form of memory found in PCs.

● **EDO (Extended Data Out RAM)** Memory that is cached to improve performance.

● **FPM RAM (Fast page mode)** Like EDO Ram but without the onboard cache

● **ROM (Read-Only Memory)** A type of memory which can only be read: you can't make changes to it as you can to RAM. It is commonly used for things that will never need to be changed, like the information the computer requires when you start it up.

● **SDRAM (Synchronous DRAM)** The latest type of fast memory. This runs at the same speed as the processor and allows the input and output of data at the same time.

● **SRAM (Static RAM)** Retains memory until the power is switched off.

● **VRAM (Video RAM)** Faster than DRAM, this is used by graphics cards.

## **MMX (Multimedia extensions)**

(See Pentium)

## **Modem**

The word is a contracted version of "modulator/demodulator", which means that a modem is a box (or, less commonly, an expansion card) that lets your computer talk over phone lines to other computers.

## **Monitor**

Your computer's screen. Signals are sent to it from the video card.

## **Motherboard**

The main printed circuit board which houses processor, memory and other components.

## **N**

## **Network**

A network is a group of computers linked together with cable. The most common form of network is a LAN (Local Area Network), where electronic mail and other files can be exchanged between users without swapping floppy disks. Printers and other resources can be shared. All the PCs on a LAN are connected to one server, which is a powerful PC with a large hard disk that can be shared by everyone.

## **O**

## **OS (Operating System)**

The operating system communicates with the hardware and provides services and utilities to applications while they run, such as saving and retrieving files.

## **P**

## **PC Card**

Formerly PCMCIA. A standard to allow PCs, particularly notebooks, to be expanded using credit card-sized cards.

## **PDA (Personal Digital Assistant)**

Small electronic organisers. The Psion 3a is a typical example.

**PCI** (See Local bus)

**PCMCIA** (See PC Card)

**Package** (See Applications)

## **Parallel ports**

Used by your PC to communicate with the outside world, usually via a printer. Information can travel in parallel along a series of lines, making it faster than serial ports which can only handle one piece of information at a time.

## **Pentium**

Fast 32-bit processor with a built-in 16Kb cache. Now the standard on PCs. It is about to be replaced by the Pentium MMX chip which has extra instructions and a 32Kb cache. The Pentium Pro is a higher-end workstation CPU with 256Kb cache meant for full 32-bit operating systems like Windows NT.

## **Pixel**

Picture element. The smallest addressable dot displayed on a monitor.

## **PowerPC**

This family of RISC chips is the result of a collaboration between IBM, Apple and Motorola. It is now used in all Apple Macintosh computers and many IBM workstations.

## **Processor**

Chip which does most of a computer's work.

**Programs** (See Applications)

## **Public domain**

Software that is absolutely free. The author usually retains the copyright but you can make as many copies as you want and pass them to other people. "Public domain" software is often confused with "shareware".

## **Q**

## **QWERTY**

The name of a standard English-language keyboard, derived from the first six letters in the top row. French equivalent is AZERTY.

## **R**

## **RAM (Random Access Memory)**

(See Memory)

## **Reboot**

(See Boot)

## **RISC (Reduced Instruction Set Computing)**

These are beginning to replace CISC (Complex Instruction Set Computing) as they're usually faster. The PowerPC chip is a typical example.

## **ROM (Read Only Memory)**

(See Memory)

## **RTF (Rich Text Format)**

(See ASCII)

## S

### SCSI

Small Computer System Interface is a bus that comes as standard in a Macintosh and is beginning to rival EIDE on PCs.

### Serial port

Serial ports (com1 and com2) are used by your PC to communicate with the outside world. Mostly used by modems and similar devices which communicate quite slowly. Faster communications are achieved through the parallel port.

### Shareware

A method of distributing software. It is freely available, but not free of charge. You are honour-bound to pay a small fee to the software's developer if you continue to use the program after a set period.

### SIMM (Single Inline Memory Module)

The standard modules for memory expansion on PCs. Older 30-pin SIMMs have now been replaced by the 72-pin variety available in capacities up to 16Mb.

## T

### Tape streamer

Magnetic tape recorder for backing up data from a hard disk.

## U/V

### UART (Universal Asynchronous Receiver Transmitter)

Pronounced "you-art", this is a chip that allows

your PC to cope with high-speed communications.

### V.34 Plus, V.34, V.32bis

A series of CCITT standards which define modem operations and error correction. There are more than 20, but the key ones are:

- **V.32bis**, the standard for 14.4Kbps (kilobits per second) modems.
- **V.34**, the standard for 28.8Kbps modems (see Baud).
- **V.34 Plus**, the new standard for speeds up to 33.6Kbps.

### VESA (See Local Bus)

### VGA

Video Graphics Array is the name given to a popular display. VGA graphics have 640 pixels horizontally and 480 vertically, and can display 16 colours. SuperVGA (SVGA) graphics can display 800 x 600 or 1,024 x 768 in as many colours as the memory in your graphics card will allow: up to 16.4 million, or true colour.

### VL-Bus (See Local Bus)

### VRAM (See Memory)

## W

### Windows

A GUI (Graphical User Interface) developed by Microsoft. Windows is intended to make programs easier to use by giving them a standard, mouse-driven interface.

- **Windows 3.11** 16-bit operating system.

- **Windows NT** Robust, fully 32-bit operating system from Microsoft. The latest, version 4.0, features a Windows 95 interface.

- **Windows 95** Major improvement to Windows 3.11, with a redesigned interface. Less prone to crashes and easier to use, but requires more memory.

### Winsock

Short for "sockets for Windows". The Winsock.dll is an extension for Windows which is necessary for connecting to TCP/IP networks.

### World Wide Web

Service on the internet using special software called web browsers (Netscape and Internet Explorer are two best-known browsers) to give access to pages of information with text, pictures and multimedia.

### WYSIWYG

"What You See Is What You Get": what you see on the screen is exactly what you will get when you print out your work.

## Z

### ZIF (Zero Insertion Force)

Sockets used for large CPUs. Lifting a handle enables you to remove the processor.

### ZIP

The common standard for compressing files so that they take up less space. Zipped files have the extension .zip and are compressed and decompressed using shareware utilities such as Winzip and PKZip.

# Buying a Printer

There are two main types of printer: laser and inkjet.

## Lasers

Most office printers are lasers. They work much like photocopiers. They are cheap to run and print quickly. The disadvantage is the higher initial cost and mono output. Laser printers are available in all sizes and all prices. Small desktop printers cost as little as £300. You can buy colour laser printers but they are still expensive; typically £5,000 or more.

### Types of laser

PCs print by sending a description of the page to be printed down a printer cable. There are three commonly-used page description languages (PDLs):

- **PostScript**

This sends an outline in vector form (see Drawing Software) to the printer where it is rasterised (converted into dots) and printed to the device's best ability. PostScript is device-independent so the image looks the same on a monitor (75dpi), a laser printer (300dpi) and a professional image-setter (2,400dpi).

- **PCL (Printer Control Language)**

Hewlett-Packard's alternative to PostScript,

licensed to many clone-printer manufacturers. Printers using PCL tend to be cheaper than PostScript ones, but output will vary from one machine to another, making it less well suited to professional use.

- **GDI (Graphical Device Interface)**

These printers download the description of your page, already used by Windows, straight to your printer. They only work with Windows but are cheap and fast. They are only suitable for a personal printer and will not work across a network.

- **Inkjets**

Inkjets work by spraying ink onto paper. There are still some mono inkjet printers available, but it is best to stick with a colour inkjet as the price difference is negligible. They are cheap to buy but more expensive to run, and slower. Even cheap inkjets can print in good-quality colour, especially on high-resolution paper.



## PCW Recommended products

### Inkjet printers

**Canon BJC-80:** RRP £233;  
Canon 0121 680 8062 (PCW January 98)

**ALPS MD-1000:** RRP £299;  
ALPS 0800 973405 (PCW January 98)

### Laser printers

• **Cheap: Panasonic KX-P6300** £217;  
Panasonic 0500 404041

**Kyocera F5-600:** £280; Kyocera 01734 311500  
(PCW February 1998)

• **Sub-£750: Hewlett-Packard 5P:**  
HP 01344 369222 (PCW November 95)

- **Network lasers**

**Hewlett-Packard 5M:** RRP £1,659 ex VAT;  
HP 01344 369222



# Buying a **Multi Function Device**

For home use and in small offices, a hybrid device could be the answer.

Typically, MFDs combine a printer, a fax machine and photocopying and scanning capability into one device. And while this saves space, it does have some drawbacks. For one thing, they tend to be based on inkjet technology which means higher running costs and lower speeds than laser-based units. Many only offer black-and-white printing: while colour models are appearing in greater volume, they tend to be based on earlier inkjet printing technologies rather than the current state-of-the-art models. Also, the scanning quality is no match for a dedicated scanner:

it's normally only 200dpi, which is the same quality as a fax machine and, worse, often black-and-white only. Finally, there's one fundamental problem — if your MFD breaks down, you won't be able to print or receive faxes. That said, they are here to stay, and some people love 'em.



## **PCW** Recommended products

**Hewlett-Packard OfficeJet:** £650; HP 0990 474747 (PCW January 97).

# Buying a **Digital Camera**

Just about every camera manufacturer now offers a budget-priced device and prices start from as little as £135.

A digital camera works like a conventional camera except that instead of a film, it has a grid of light-

sensitive elements. These convert light into a voltage proportional to the brightness, which is then converted into digital information the PC can understand.

The elements produce a colour bitmap file, typically of 640 x 480 pixels, although models boasting 800 x 600, 1024 x 768 and even higher resolutions are becoming increasingly common.

Most digital cameras use flash memory to store images, and offer a wired connection to a computer — slow serial on budget models or fast SCSI on professional ones.

Some cameras feature removable memory cards, usually compatible with the PC

Card standard. Quality is getting better all the time, but to match the print quality of a 35mm film camera today, you'll still have to spend thousands of pounds. The current crop of entry-level to mid-range cameras are, however, more than suitable for electronic publishing on CD-ROM or the internet.



## **PCW** Recommended products

**Sony DSC-F1:** £546; Sony 0990 424424 (PCW January 98)

**Sanyo Digicam:** £449.99; Sanyo 01923 477295 (PCW January 98)

**Epson Photo PC:** £781.38; Epson 0800 289622 (PCW Jan 98)

# Choosing an **ISP**

With over 100 ISPs to choose from, choosing an Internet Service Provider has never been so difficult.

All ISPs (Information Service Providers) allow you to send and receive email across the Internet, browse and surf the world wide web and download files from Internet servers. But there are big differences between the quality of service that each provides in terms of technical support and the quality of software supplied when you first sign up. Usually they

charge a flat monthly rate for Internet access of around £10, but on top of that you also have to pay for your phone charges

## ■ Choosing a Content Provider

There are really only three players in this field: AOL, CompuServe and MSN. They are not the best or fastest way of browsing the world wide web. Instead they aim to supply their own content in the form of discussion areas, online magazines and easily searchable file libraries. All these services offer free trials which is a good way of finding out if they're for

## **PCW** Recommended products

### Our PCW Award winners in July 97:

**Pipex Dial:** Major player with an excellent reputation.

**BT Internet:** BT has now got its act together with internet service provision.

**Direct Connection:** One of the best of the smaller ISPs.

### Content providers

**AOL:** 0171 385 9404; Consumer-orientated service that offers good performance even for users of older 14.4K modems.

**CompuServe:** 0800 289378; more business content than AOL.

# Buying a **Monitor**

Regardless of your computer application, you'll be looking at your monitor all day, so make sure you get a good one.

Some people claim not to see monitor flicker, but your brain does, resulting in fatigue and headaches. A refresh rate of 70Hz or higher will produce a flicker-free image on most monitors.

Interlacing also results in flicker. Always run in non-interlaced modes and ignore interlaced quotes. The resolution refers to the number of dots (pixels) horizontally and vertically on-screen. Standard VGA mode runs at 640 x 480 pixels, while other typical modes include 800 x 600 and 1,024 x 768. The more pixels, the more you'll be able to fit on the screen, but

everything will be smaller and may only be suitable on a larger screen. Go for a 15in or 17in monitor capable of running a resolution of 1,024 x 768 non-interlaced at 70Hz or higher.

The visible area of most monitors (and TVs for that matter) is smaller than the model implies: a 15in screen may only have a 14.5in visible area, and a 17in may have only 16in visible. Aperture grille tubes such as Sony's Trinitron or Mitsubishi's Diamondtron are very bright, but need two fine but visible wires running across the screen for stability.



## PCW Recommended products

**Panasonic Panasync 5G** (£385 ex VAT); **Taxan EV750** (£493 ex VAT); **ADI 5G** (£429 ex VAT); **Iiyama Vision Master Pro 17** (£510 ex VAT). See PCW May 97 for reviews.

**Contacts** Panasonic 0500 404041; Taxan 01344 484646; ADI 0181 236 0801; Iiyama 01438 745482



# Buying a **Scanner**

Scanners are used to import text, graphics or pictures into a PC. They vary from low-cost hand scanners not much bigger than a mouse, to drum scanners costing thousands of pounds. The latter are designed to scan photographic transparencies to professional standards.

## ■ Flatbed scanners

These are the most common type of scanner, and cost from around £300 to more than £3,000.

They are capable of scanning colour pictures to a high standard. Most have transparency adaptors as optional extras.

## ■ Document scanners

A new category of scanner which aims to combine the reliability of a flatbed scanner with speed and portability. They are intended for OCR and document management. Most will cope with photographs and some with colour, but it's not really their forté.

## PCW Recommended products

### Document scanners

**Visioneer PaperPort VX:** street price £299; Computers Unlimited 0181 200 8282  
**Logitech PageScan Colour:** street price £155; Logitech 01344 894300

### Flatbed scanners

- **Intermediate**  
**Agfa Studio Star:** street price £499 (ex VAT); Agfa 0181 231 4906 (PCW August 97)
- **Budget**  
**Umax Astra 610P:** £99; IMC 01344 871329 (PCW February 1998)  
**Microtek Phantom 4800:** £147; Midwich Thame 01379 649200 (PCW February 1998)

# Buying a **Storage Device**

For backup and storage there's a range of devices available — conventional tape backup devices, superfloppies like the LS120 and proprietary systems like the Iomega Zip drive.



Additional storage devices, taking removable media, offer endless capacity. Iomega's ZIP drive and OR Technologies' a: drive (aka LS120) offer 100Mb and 120Mb respectively. The a: drive is an alternative to a floppy as it is compatible with normal floppies. The ZIP drive only works with ZIP cartridges.

Iomega's Jaz drive and SyQuest's SyJet, take 1Gb and 1.5Gb respectively. The SyJet is quicker and boasts cheaper media, but it's new as against Iomega's proven device.

Larger storage means slow, cheap tape

drives with big capacity, perfect for overnight backup. Most quote compressed capacity, double "native" uncompressed capacity. DAT DDS-2 drives offer 4Gb native, which Seagate matches with faster Travan TR4 cartridges on its TapeStor 8000. Iomega's cheaper, slower Ditto 2000 offers 2Gb compressed backup.

CD recorders, offering double-speed writing and quad-speed reading, are around £400 ex VAT. The fastest are 24-speed, but there's little benefit in anything over 12.

## PCW Recommended products

**Iomega ZIP drive:** internal £89 ex VAT; 100Mb media £10 ex VAT; Iomega 0800 973194 (PCW August 97)

**Iomega JAZ drive:** internal £189 ex VAT; 1Gb media £60 ex VAT; Iomega 0800 973194 (PCW August 1997)

**Iomega Ditto 2000:** external £89 ex VAT; Iomega 0800 973194 (PCW July 97)

**Seagate TapeStor 8000:** internal £220 ex VAT; Seagate Technology 01628 890366 (PCW July 97)

# Buying a Sound Card

You need one of these to add sound capability to your PC.



Check compatibility with your CD-ROM drive, and remember that 16-bit cards capable of 44KHz provide higher-quality sound than slower 8-bit cards. Better sound cards now include wavetable synthesis which means they have samples of real instruments held in ROM.

The quality of wavetable synthesis still varies widely. Even cheap cards which have the inferior Frequency Modulation synthesis

should have a daughterboard connector allowing them to be upgraded to wavetable. The newer cards are also plug and play which means, in theory, that you should be able to plug them straight into a PC without any extra configuration. Most cards are bundled with extra software, normally sequencers, wave editors and audio players.

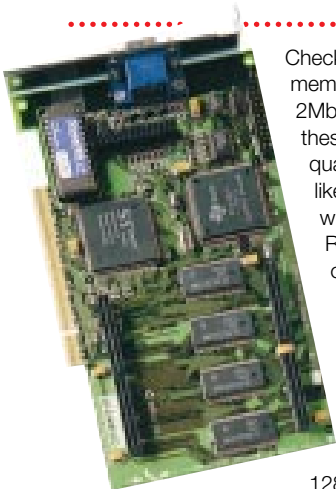
## PCW Recommended products

**AWE 64 Gold:** £199; Creative Labs 01734 344322 (PCW June 97)

**Maestro 32/96:** £139; Terra Tec 01635 294394 (PCW June 1997)

# Buying a Graphics Card

The graphics card sits inside the PC and controls the features which the software displays on the monitor.



Check the amount of memory on the card. 2Mb is standard these days. Better-quality cards are likely to be fitted with VRAM (Video RAM). Also, check out the performance capability of the card. Video cards come as 16-bit, 32-bit, 64-bit and even 128-bit: a large

number of bits means faster performance.

The most important aspect of your video card, and the most frequently quoted feature, relates to the resolution that the card supports in Windows. This is measured by the number of pixels the card displays on-screen. The absolute minimum these days is 1,024 x 768 with a refresh rate of 70Hz.

A 2Mb card can display 16-bit colour (65,000 colours) at 1,024 x 768 pixels. A 1Mb card can manage only 8-bit colour (256 colours) at 1,024 x 768 pixels. To display 24-bit colour (16 million colours) at 1,024 x 768 you'll need 4Mb of memory. The refresh rate (measured in Hz) is important, too. It represents the number of frames displayed on-screen per second. A flickering display is very tiring to use.

Find out if your video card is "local bus". Local bus (PCI or VL) is an interface which connects your video card to the motherboard. It allows the memory in the card to be addressed directly by the CPU, which makes it a lot faster than the standard ISA interface.

## PCW Recommended products

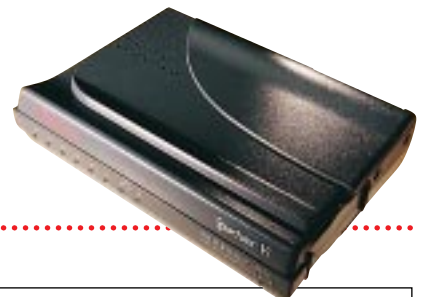
**ATI Xpert@ play:** £163 (4Mb); ATI 01628 533115

**Hercules Stingray 128/3D:** £210 (6Mb); Hercules 01635 294300

**Orchid Righteous 3D:** £132; Orchid 01256 479898 (PCW January 1998)

# Buying a Fax Modem

You'll need a modem to connect to the internet or an online service, such as CompuServe or AOL, and also to send and receive email.



Modems are available in three formats: either as PC Cards to plug into notebooks, or as external boxes, or as expansion cards. PC Card modems are the most expensive, while external modems cost slightly more than expansion cards.

Apart from the casing and the external power supply, there is often very little difference between the internal and external

versions of a modem. Most now have a built-in fax capability, which means you can receive faxes on your personal computer to view or print out.

Go for a V.34 28.8Kb/sec modem or one of the new V.34+ 33.6Kb/sec modems. Or, look out for the new 56K versions: these use one of two rival technologies but as yet are unsupported by Information Service Providers.

## PCW Recommended products

**Fax modems**

- Internal

**Pace 56 Voice:** £169; PMC 0990 561001 (PCW November 97)

# Buying Software

Only a few years ago there were dozens of different software applications in each category. During the past two years or so, however, there has been rapid product consolidation. Other magazines list large numbers of packages, most of which are out of date and not worth considering. We've distilled each category down to just one or two recommended products.

## A

■ **ACCOUNTS SOFTWARE** One of the few categories in which there are still masses of packages on the market at a huge range of different prices. Accounts is also one of the last bastions of DOS.

**Recommended products:** MYOB, Intuit QuickBooks.

## B

■ **BROWSERS** are programs which are used to navigate the internet. A modern browser lets you navigate web pages, download files and send and receive email.

**Recommended products:** There are only two worth talking about: Netscape Navigator and Microsoft Internet Explorer.

## C

■ **CAD SOFTWARE** Computer Aided Design covers everything from architectural drawings, through office planning, to complex engineering drawings.

**Recommended products:** AutoCAD is the industry standard but we think MicroStation 95 is a more capable product at the high end of the market. At the cheap end, DesignCAD 3D offers astonishing value for money.

■ **CONTACT MANAGERS** (See PIMs)

## D

■ **DATABASE** At its simplest, an electronic card index. For just a few hundred names and addresses an electronic-type Filofax, such as Lotus Organizer, may be more appropriate. But for more sophisticated applications like tracking products and customers, the power of a relational database is required. Databases are generally the least user-friendly of the main suite applications. In most offices you are likely to use a database

application that somebody else has written for you.

**Recommended products:** Lotus Approach, Microsoft Access.

■ **DESKTOP PUBLISHING SOFTWARE (DTP)** This is software used to create newsletters, magazines, books, brochures or advertisements.

Typically, it enables you to incorporate graphics, lay out text in multiple columns and run text around graphics. You also have control over how text appears, in varying degrees of sophistication.

**Recommended products:** The high-end market leader is Quark XPress on the Mac. On the PC, PageMaker is strong. For serious work on a budget we recommend Serif Publishing Suite, and for sheer ease of use, Microsoft Publisher.

■ **DRAWING SOFTWARE** Programs for drawing, which work using vectors. This means each shape drawn is described using mathematical equations.

**Recommended products:** At the budget end of the market, MicroGraphx Windows Draw 5 stands out. At the professional end, Corel Draw 7 gets our vote.

■ **IMAGE EDITING SOFTWARE** A program for editing bitmap files (files made up of pixels). Typically used for converting graphics files, retouching photographs and preparing pictures for printing.

**Recommended products:** For simple image editing the popular shareware program, PaintShop Pro, is fine. For professionals, Adobe's Photoshop is the industry standard.

■ **INTEGRATED PACKAGES** Typically, these combine the functionality of a database, word processor and spreadsheet in one application. This makes it easy to move data from one component to another but

integrated packages tend to lack some of the advanced features of individual applications.

**Recommended product:** Microsoft Works.

## J

■ **JAVA.** A language based on C++, but easier to learn and use. Java runs on a "virtual machine" interpreter, so programs can run on many different platforms.

**Recommended products:** Borland JBuilder

## M

■ **MULTIMEDIA AUTHORING TOOLS** Programs designed for producing interactive multimedia applications; typically for training applications or for CD-ROMs. The software lets you control and manipulate different types of media such as sound files, audio files, video clips and graphic files.

**Recommended product:** Macromedia Director, the product used to produce PCW's cover-mounted CD-ROM, gets our vote.

## O

■ **OCR SOFTWARE** Optical Character Recognition software converts printed text into computer text you can edit. You will need a scanner or fax card to get the printed text onto your PC. OCR saves re-keying documents and can cut down drastically on paper filing systems.

**Recommended products:** OmniPage is the best product we have found, but TextBridge offers most of the same capabilities for less cash.

## P

■ **PERSONAL INFORMATION MANAGERS (PIMs)** PIMs are an electronic way of storing names, addresses, phone numbers and appointments. Contact managers take the idea one step further to include business information about dealings with clients.

**Recommended products:**

SideKick 95 and Organizer are excellent PIMs. For contact managers we would recommend Goldmine for Windows.

■ **PRESENTATION GRAPHICS** Increasingly, the trend is towards doing presentations on a PC and the latest packages tackle this by including sound, sophisticated transitions between slides and support for video clips.

**Recommended products:** Powerpoint and FreeHand are both capable products sold with Microsoft Office and SmartSuite respectively.

■ **PROGRAMMING TOOLS** Applications designed for writing software. These range from "low-level" languages which are powerful but difficult to learn and use, to "high-level" languages which, although much easier to use, generally sacrifice performance and flexibility in the process. Commercial programs like Word for Windows are written using low-level languages.

Bespoke applications and prototypes are often written using Delphi or Visual Basic.

**Recommended products:** Delphi 3.0 is a great example of scalability, catering for beginners and serious developers working on major projects. Optima Power++ is the pick of the high-end Windows development tools.

■ **PERSONAL FINANCE PACKAGES** These help manage home finances. They are also well suited to some small businesses and tend to be easier to use than full-blown accounts packages.

**Recommended product:** Quicken is the outstanding product in this category and has no serious rivals.

■ **PROJECT MANAGEMENT** Programs for managing large projects — anything from building a power station to planning a

marketing campaign.

**Recommended product:**  
SuperProject 4.0 for Windows.

## R

■ **REMOTE CONTROL S/W** Lets you access and control a PC remotely, usually via a modem.

**Recommended product:**  
ReachOut, for its simple interface and support for different networks, particularly TCP/IP.

## S

■ **SPREADSHEET** This is an electronic version of what would be an old-fashioned ledger.

Excellent graphing and charting facilities are included.

**Recommended products:**  
Lotus 1-2-3, Microsoft Excel.

■ **SUITES** Most general business software is now sold in suites.

Two suites are widely available: Lotus SmartSuite and Microsoft Office. Lotus SmartSuite also contains a database. With Microsoft Office, you pay extra for Office Professional which contains Microsoft's Access database.

**Recommended product:**  
Microsoft Office is close to the

industry standard. Its high level of integration gives it the edge over the opposition.

## V

■ **VISUAL PROGRAMMING** (see Programming Tools)

## W

■ **WEB EDITORS** Programs designed to do for web page design what DTP did for magazines and newsletters. They let you create web pages without writing HTML. You can incorporate graphics, backgrounds, tables, images and sounds.

**Recommended products:**

HotMetal Pro 3.0 is our first choice, while Adobe Pagemill is a capable alternative.

■ **WORD PROCESSOR** An application in which you can write letters and prepare reports, or produce a simple newsletter. The latest word processors have advanced features such as outliners, table editors and facilities for adding columns of figures.

**Recommended products:**  
Microsoft Word is the clear market leader but WordPro is a capable alternative.

## A-Z of Recommended Software Products

■ *If you would like to read any of the reviews of software listed here and do not have the original issues, you can order Personal Computer World on CD-ROM. It costs just £9.95 (including postage and packing). See pages 322/323 for full details.*

	Category	Product	Supplier	Contact	Price (ex VAT)	Date of PCW review
<b>A</b>	Accounts	MYOB	Bestware	01752 201901	£195	April 1997
	Accounts	QuickBooks	Intuit	01932 578501	£125	April 1997
<b>B</b>	Browsers	Netscape Navigator	Netscape	0181 564 5100	£49	Mar 1997
	Browsers	Internet Explorer	Microsoft	0345 002000	Free	Jun 1996
<b>C</b>	CAD	Microstation	Bentley	01344 412233	£3,495	Jan 1997
	CAD	DesignCAD 3D	BVG	01874 611633	£149.95	Jan 1997
<b>D</b>	Database	Approach 97	Lotus	01784 455445	£40	Oct 1997
	Database	Access 97	Microsoft	0345 002000	£235	Oct 1997
	Desktop publishing	XPress 3.3	Quark	01483 454397	£795	May 1997
	Desktop publishing	Publisher	Microsoft	01734 270000	£70	May 1997
	Desktop publishing	Publishing Suite 3.07	Serif	0115 9421502	£99	May 1997
	Drawing	CorelDraw 7	Corel	0800 973189	£495	Sept 1997
<b>I</b>	Drawing	Windows Draw 5	MicroGraphx	0345 089372	£38.30	Sept 1997
	Image editing	Photoshop	Adobe	0181 606 4000	£382	Dec 1996
<b>J</b>	Image editing	PaintShop Pro	Digital Workshop	01295 258335	£49.95	Jun 1995
	Integrated package	Works/Win 95	Microsoft	0345 002000	£93.61	Apr 1997
	Java programming	JBuilder	PowerSoft	01628 597100	£399	N/A
<b>M</b>	Multimedia authoring	Director 5.0	Macromedia	0181 200 8282	£99	Oct 1996
	OCR	PaperPort Plus	Visioneer	0800 973245	£58.72	Dec 1997
<b>O</b>	OCR	Presto! OCR Pro 3.0	Guildsoft	01752 895100	£58.72	Dec 1997
	Personal finance	Quicken	Intuit	0800 585058	£34	May 1996
	PIM/contact manager	Organizer 2.1	Lotus	01784 455445	£99	Jun 1997
	PIM/contact manager	Goldmine for Windows	Elan Software	0171 454 1790	£395	Jun 1997
	PIM/contact manager	Sidekick 95	Starfish UK	0181 875 4400	£39	Jun 1997
	Presentation graphics	Freelance	Lotus	01784 455445	£415	Nov 1996
	Presentation graphics	Powerpoint	Microsoft	0345 002000	£220	Nov 1996
	Programming tools	Power ++ 2.0	PowerSoft	01628 597100	£345	Sept 1997
	Programming tools	Delphi 3.0	Borland	01734 320022	£89	Apr 1997
	Project management	SuperProject 4.0	Computer Associates	01753 679679	£495	May 1996
<b>R</b>	Remote control/Access	PC Anywhere	Symantec	01628 592320	£139	Nov 1997
<b>S</b>	Spreadsheet	Excel	Microsoft	0345 002000	£220	May 1995
	Spreadsheet	1-2-3	Lotus	01784 455445	£365	May 1997
	Suite	Office (Standard)	Microsoft	0345 002000	£360	Jul 1997
	Suite	Office (Professional)	Microsoft	0345 002000	£460	Jul 1997
<b>W</b>	Web authoring	HoTMetal Pro 4.0	SoftQuad	0181 387 4110	£69	Jan 1998
	Web authoring	FrontPage 98	Microsoft	0345 002000	£99	Jan 1998
	Word processing	Word	Microsoft	0345 002000	£220	Oct 1996

# ChipChat



■ If you tried to solve our January-issue crossword, you will have noticed that the clues did not match the grid. And, to boot, the solutions were not even the answers for the December-issue crossword, but a repeat of November's! We're sorry about the muddle and hope it didn't spoil your enjoyment of the January issue. The correct crossword, with matching solutions, has been printed in this month's issue (p327), along with the solution for December's crossword.

■ In last month's *Long Term Test* review of the Pilot 5000 we regrettably could not supply the author's full name. It was Aiden Harding.

*We apologise to readers for any confusion caused by these errors.*

## Chippets from abroad

### ■ How to put the skids under the kids

The president of George Washington University, Dr Stephen Trachtenberg, who was in Christchurch, New Zealand, this month, dismissed the theory that technology would replace the need for university campuses. "Nature makes young people especially obnoxious at about 17 years of age. Their parents want them out of the house and universities serve a role by not making the parents feel guilty," he said.

NZ News Online

### ■ Brazilians go nuts

The Brazilian government last week ordered all copies of videogame *Carmageddon* off the shelves, claiming that the game had led drivers to acts of violence. GameSpot

**Right Shock! Horror! Driving madness hits Brazilian streets with the release of a new game**



## Caption competition



**Above** "Hi Mum! You'll never guess what happened to us this morning?"

■ Think you can do better than this? Email [captions@vnu.co.uk](mailto:captions@vnu.co.uk) or enter via our web site, or write to the usual PCW address (p10) with your own captions on a postcard marked "February Caption Compo" before 15th January.

We'll print the funniest entry and the winner will receive a £20 book token.



Congratulations to Tony Gilbert, who won December's caption competition (above) with this: "O'Kai kids, which one of you dropped Power Goo on the floor?"

reports that Brasoft, the game's Brazilian distributor, will not only comply but has announced that it will release an educational CD-ROM about driver safety.

*Wired*, 4th Dec '97

### ■ Coffee and Danish

Journalists are not renowned as "morning people" and it was with some awe that one group,

on a trip to the US, met a certain Unisys manager from Denmark. She rises every morning at 5am to spend quality time with her young son, and made some highly amusing but derisory comments about the nocturnal habits of those journalists present.

Inevitably, the only person to be late on the trip was our Danish colleague. Concerned chums let the telephone ring for minutes and even knocked on her door, but, no response.

Finally, the hotel manager was persuaded to use his pass key and found her, sleeping like a baby, right next to a ringing telephone and a blaring clock radio.

Which proves the old saw: Early to bed, Early to rise, Makes you healthy, wealthy... and late. ■